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PHILCO CLR-12
INSTRUCTION MANUAL

MICROWAVE RECEIVING EQUIPMENT
MODEL RM-68
&
POWER SUPPLY MODEL RP-68

SER # 125

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SER # 125

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IMPORTANT

1. This manual is shipped with:

   RECEIVER MODEL RM-68 SERIAL # 125

   KLYSTRON TYPE QKK-75Z SERIAL # C-4978

   POWER SUPPLY MODEL 600 SERIAL # 171

2. The TEST MEASUREMENTS DATA CHART contained in this manual specifically refers to the above equipment only.

3. Receiver serial # 125 is tuned to 7.455 kmc/s.

TRANSMITTER SITE

~~Xmit to Davis~~.
Rec. from Davis

GENERAL

This equipment constitutes the receiving terminal of an FM microwave system. Design considerations of this superheterodyne receiver are such that it can be used for broad band video reception, STL, CATV, multichannel telephone communication (600 channel), high bit-rate data links, one way or duplex transmission and multi-channel operation. Compact construction allows for multiple receiver rack mounting in fixed locations or mobile shelter at minimum space requirements.

Modular design of receiver sections and a separate power supply permits rapid servicing, reducing outage time. All modules are mounted on a slide out chassis, and are readily accessible for maintenance and replacement.

A Block Diagram of the Receiver is shown in figure A.

SPECIFICATIONS

RECEIVER MODEL RM-68

FREQUENCY BAND:	5925 - 8500 mc/s
NOISE FIGURE:	13db.
FREQUENCY STABILITY:	±0.5 mc/s of center frequency of I.F. amplifier at ambient temperature range of -20°C to +55°C for line voltage 105 to 130 volts ac.
THRESHOLD SENSITIVITY:	-117 dbw.
I.F. BANDWIDTH:	30 mc/s, centered at 75 mc/s ±0.25 db.
IMAGE REJECTION:	80 db.
VIDEO BANDWIDTH:	30 cycles to 8.0 mc/s ±0.25 db.
VIDEO GAIN: WITHOUT PRE & DE	15 db, flat ±0.25 db from 30 cps to 8.0 mc/s.
OUTPUT CAPABILITY:	1.5 volts p-p into 75 ohms either positive or negative video for 10 mc/s p-p deviation.
TUBE COMPLEMENT:	Local Oscillator - (1) reflex klystron (type depends on frequency band). Preamplifier - (1) 6DJ8/6922, (2) E180F/6688. IF Amplifier - (5) E180F/6688, (1) 6U8A/6678. Discriminator- (1) E180F/6688, (1) 6CL6/6677, (2) 12AX7/6681, (1) 12AU7/6680, (1) 12BY7A/7733. Video Amplifier - (1) 6CY5/6AK5/5654, (1) 6DJ8/6922, (1) 6CL6/6677.
PHYSICAL:	19 x 8-3/4 x 25-1/2 inches, 51 lbs, standard 19" rack mounting.

POWER SUPPLY MODEL RP-68

POWER REQUIREMENTS:	105-130V, 60 ± 2 cycles, 1 ø, 210 watts.
TUBE COMPLEMENT:	(1) GV3B-600, (1) 0A2, (1) 0B2, (1) 6146, (1) 5651, (1) 6U8A/6678.
PHYSICAL:	19 x 8-3/4 x 17-1/2 inches, 45 lbs, standard 19" rack mounting.

MICROWAVE RECEIVER
MODEL RM-68

TECHNICAL DESCRIPTION

R.F. SECTION

The receiver R.F. section consists of an input filter, mixer, L.O. attenuator and filter section. The R.F. section design is such that no additional R.F. components are required for the multiplexing of up to eight receivers. Shown in Dwg. C-239 is a schematic of the R.F. section.

In operation, energy from the receiving antenna is fed into the input flange of the receiver. The R.F. energy travels down the vertical riser to an "H" wall port where it is coupled into a five section filter. The electrical length of the lower part of the vertical riser is adjusted to multiples of half wave lengths. In this manner a short circuit is presented to the vertical riser at a point just below the filter coupling port. With the five section band-pass filter tuned to a given frequency, all the energy in the vertical riser tuned to that frequency is coupled into the filter. The design of the input filter is maximally flat with a band-pass of 30 mc/s at the 0.5 db points.

The output of the filter is fed to a single ended mixer. L.O. energy, 75 mc/s removed from the incoming carrier, is coupled to the mixer diode through a port in the "H" wall of the mixer section. An adjustable short circuit after the mixer diode is used to optimize the I.F. output of the mixer.

The mixer I.F. output is fed into a transformer filter section. This is used to transform the mixer impedance to 75 ohms. A DC return, as well as a metering point for the mixer diode is also provided at this point. The 75 mc/s signal is taken from J-703 and fed to the I.F. preamplifier through a 75 ohm cable.

The Local Oscillator klystron is mounted in the Common Connection Panel and coupled by coaxial cable to J-704 on the Waveguide Assembly. At J-704 a coaxial to Waveguide adapter forms an integral part of the waveguide assembly. The L.O. energy then passes through an attenuator to a one section filter and into the mixer. The attenuator is used to set the L.O. level for best noise figure. The one section filter is provided to facilitate the tuning of a replacement klystron.

I.F. PREAMPLIFIER

The preamplifier is a three tube amplifier providing approximately 45db of gain over a 30 mc/s bandwidth centered at 75 mc/s. A cascode input section is used to provide a noise figure of approximately 2.8db. The input of the amplifier is matched to 75 ohms by the use of reactive elements only. Cathode inductance is used to achieve the desired match at the input.

AGC voltage derived from the main I.F. amplifier is applied to the second and third tubes of the preamplifier. This is done to prevent overloading the preamplifier under high signal level conditions. AGC is not applied to the first tube of the preamplifier so as to maintain an optimum noise figure at the preamplifier input.

A hybrid matching network is used to provide two 75 ohm output terminals. In normal operation one of these terminals is terminated with a 75 ohm resistor. The other is used to drive the main I.F. amplifier.

PHASE EQUALIZER

The band-pass filter characteristic of the preamplifier and main intermediate frequency amplifier has a phase delay that makes these two units look electrically longer at each edge of the band than in the center of the band. This electrical delay must be equalized over the pass-band to eliminate phase intermodulation or differential phase in complex signals. The desired equalization is obtained by a network inserted between the preamplifier and main I.F. amplifier. This network is part of the preamplifier unit.

Signal from J-402 of the preamplifier is fed into the network through J-404. Equalized output signal from J-405 of the network is fed to the main I.F. amplifier.

Input and output connections to the phase connector network are through built-in pi type resistive attenuators. The actual phase correction is achieved by a bridged T network consisting of a parallel resonant circuit in series with the line and a series resonant circuit shunted across the line. These two circuits are both resonant at I.F. center frequency. The interconnection between the two circuits is made by a powdered iron core auto transformer. By proper adjustment of the L/C ratios of the two circuits, the proper phase equalization is achieved while maintaining a flat attenuation characteristic.

BANDWIDTH REDUCTION FILTER

When required, a "bandwidth reduction filter" is provided to reduce the bandwidth of the receiver to 20 mc. The narrower I.F. bandwidth lowers the threshold of the receiver such that a greater fade margin is obtainable.

The filter is composed of four "m" derived sections with m's of .6. The mid-series configuration is used in the design because the coil and capacitor values are readily realizable. The input and output of the filter is matched to 75 ohms over the band of interest.

When this filter is required it is placed in series with the output of the preamplifier and the input of the phase equalizer. The bandwidth reduction filter mounts on top of the preamplifier chassis.

MAIN I.F. AMPLIFIER

The main I.F. amplifier is a 5 tube band-pass amplifier. The bandwidth of the amplifier is 30 mcs, centered at 75 mc. The response is flat ±0.5db over its band-pass. Maximum I.F. amplifier gain is approximately 75db. The input to the I.F. is matched to 75 ohms.

The interstage network between the first and second tube is a "T" slightly overcoupled and approximately 20 mc/s at the 3db points. The interstage between the second and third is an overcoupled pi with a 9db peak to valley ratio and a bandwidth of about 32 mc/s at the 1db points. The third interstage is a repeat of the first and the fourth is a repeat of the second. The output stage is a modified pi configuration approximately 30 mc wide at 1db points.

Variable loading is provided on all interstages such that inband characteristics can be closely controlled.

A hybrid output network is used to obtain two 75 ohm output terminals and a high degree of backmatch.

AGC is derived as follows: Connected to the plate of the output stage is a voltage doubler diode detector, one end of which is returned to a variable bias. The output of the detector is amplified by an AGC amplifier. The AGC buss of the I.F. amplifier is taken from a voltage divider, the high end of which is driven by the AGC amplifier. The variable bias on the detector serves to set the output level of the I.F. amplifier.

The first three tubes of the I.F. have their gain controlled by the AGC buss as well as the last two tubes of the preamplifier. The fourth and fifth tubes of the I.F. have their grids returned to a fixed bias. The time constant of the AGC buss is long enough to allow for conventional sweep alignment techniques.

The triode section of V-206 is used as a relay driver for receiver squelch purposes. The grid of the triode is driven from the plate of the AGC amplifier through a 220K resistor. An adjustable negative bias is applied to the relay driver grid through a 1.2 megohm resistor. This bias serves to cut off the relay driver and, therefore, keep the relay de-energized. Under low signal conditions an increasingly positive bias is applied to the relay driver by the AGC amplifier thus overriding the set bias and energizing the relay.

The contacts of the squelch relay are used to de-activate the AFC circuit, control lights on the front panel, and squelch video output if desired, and are brought out to the rear panel for remote alarm purposes.

DISC. & AFC

The output of the I.F. amplifier is fed into the discriminator and AFC unit by a 75 ohm double shielded cable.

The input to the Disc. & AFC unit is matched to 75 ohms by the use of a resistively loaded pi network. The interstage network between the input tube and the disc. driver includes a solid state peak limiter. The limiter is designed to remove A.M. components of the I.F. signal that fall within the base band of the receiver.

The discriminator circuit consists of two slope detectors, one tuned below the I.F. frequency, the other tuned above the I.F. frequency. The outputs of the two slope detectors are added to achieve the conventional discriminator "S" curve.

The video output of the discriminator is coupled through a series peaking coil to a cathode follower. The cathode resistor of the cathode follower is a potentiometer used for video level control. The wiper arm of the potentiometer is DC coupled to the video output connector. The video output of the Disc. & AFC unit is then connected to the video amp. through a coaxial cable.

The output of the discriminator is also fed through a low pass filter to remove video components and derive a DC AFC control voltage. This AFC control voltage is fed to the AFC DC amplifier through the contacts of the squelch relay and the AFC on-off switch. When the squelch relay is energized, the AFC is disabled to prevent the receiver "locking out" on noise.

The DC component of the discriminator output is then fed into a DC coupled differential amplifier. This AFC amplifier has a very high degree of AC inverse feedback such that frequencies above two or three cycles are not amplified. This is done in order to prevent AFC bounce due to sudden line surges and rapid changes in video content. A balance control is provided to set the amplifier in the center of its operating range.

The output of the differential amplifier is direct coupled to a cathode follower which is in turn DC coupled to the low voltage end of the repeller supply corona discharge tube. See figure B. Since the voltage drop across the voltage regulator tube is constant, any voltage change at the low voltage point (A) is directly transferred to the high voltage end point (B) and, therefore, to the klystron repeller.

Clamp diodes are provided at the output of the differential amplifier to prevent the repeller voltage swing, due to AFC action, from exceeding ±15V. This is provided to prevent receiver lock-out in the case of transmitter malfunction as well as preventing the receiver from locking out on stray radiation into the receiver.

A triode cathode follower is provided for metering of the discriminator DC output. A potentiometer in the cathode of the triode allows for setting of the front panel meter on a 10-0-10 volt scale such that frequency deviations either side of center may be observed.

VIDEO AMPLIFIER

The video output of the discriminator is DC coupled to the video amplifier.

The video response of the amplifier is adjusted by two peaking coils and a variable capacitor in the input tube circuitry. The variable capacitor is a variable cathode by-pass. An increase in capacitance acts to increase the high frequency gain of the amplifier while a decrease in capacitance decreases the high frequency gain. On a sweep presentation a tilting action is observed when the cathode capacitor is varied.

The shunt peaking plate coil is used for mid-band peaking while the series peaking plate coil is used for high frequency peaking of the base band.

The output of the first tube is coupled to a three stage amplifier which has overall feedback. Fixed peaking is used in the amplifier stages in the feedback loop as well as fixed cathode by-passes. Unique coupling networks are used which extend the low frequency response yielding a low value of square wave tilt.

Both positive and negative outputs are available from the video amplifier. The output taken from the cathode provides negative going video. Both outputs are taken out to connectors located on the rear panel. The gain of the amplifier is 15db, and is flat ±.25db, 30 cps to 8 mc.

COMMON CONNECTION PANEL

A common connection panel performs voltage distribution, metering, and module interconnection functions. The squelch relay, which is driven by a tube in the I.F. chassis, is mounted in this panel. Metering shunts and multipliers are also mounted in this chassis. One single deck and one five deck selector switches are used to perform the metering functions.

Mounted on the front of the common connection panel is a dual concentric potentiometer which controls the klystron repeller voltage. One potentiometer is a coarse voltage control and the other a fine control. The AFC"ON-OFF" switch is a part of this potentiometer assembly.

On the side of the common connection panel are three potentiometers and two toggle switches. These are used for set up and maintenance and will be described in the maintenance section.

POWER SUPPLY

The power supply is regulated for line and load and provides all receiver operating voltages. Line regulation is provided by saturable core transformers. Load regulation is accomplished with, "hard tube", gaseous discharge, and corona regulators.

The klystron beam supply consists of a full wave rectifier, a series regulator and feedback amplifier. The voltage output of the full wave rectifier is approximately 475V, the positive side of which is returned to the plate of the series regulator. The negative side of the rectifier is brought out as the negative 300V supply. This voltage is divided down to approximately 85 volts and fed to the grid of a differential amplifier. The second input of this amplifier is returned to an 85V voltage reference tube. The plate output of the differential amplifier is returned to the control grid of the series regulator tube. The above circuitry forms a series tube regulator and it is conventional in its operation.

The klystron filament supply is a 6.3V adjustable DC supply. A voltage doubler circuit on the 5 volt winding of the transformer provides approximately 7.5V when loaded by a local oscillator klystron filament. A rheostat is used to adjust the voltage to a nominal value of 6.3V.

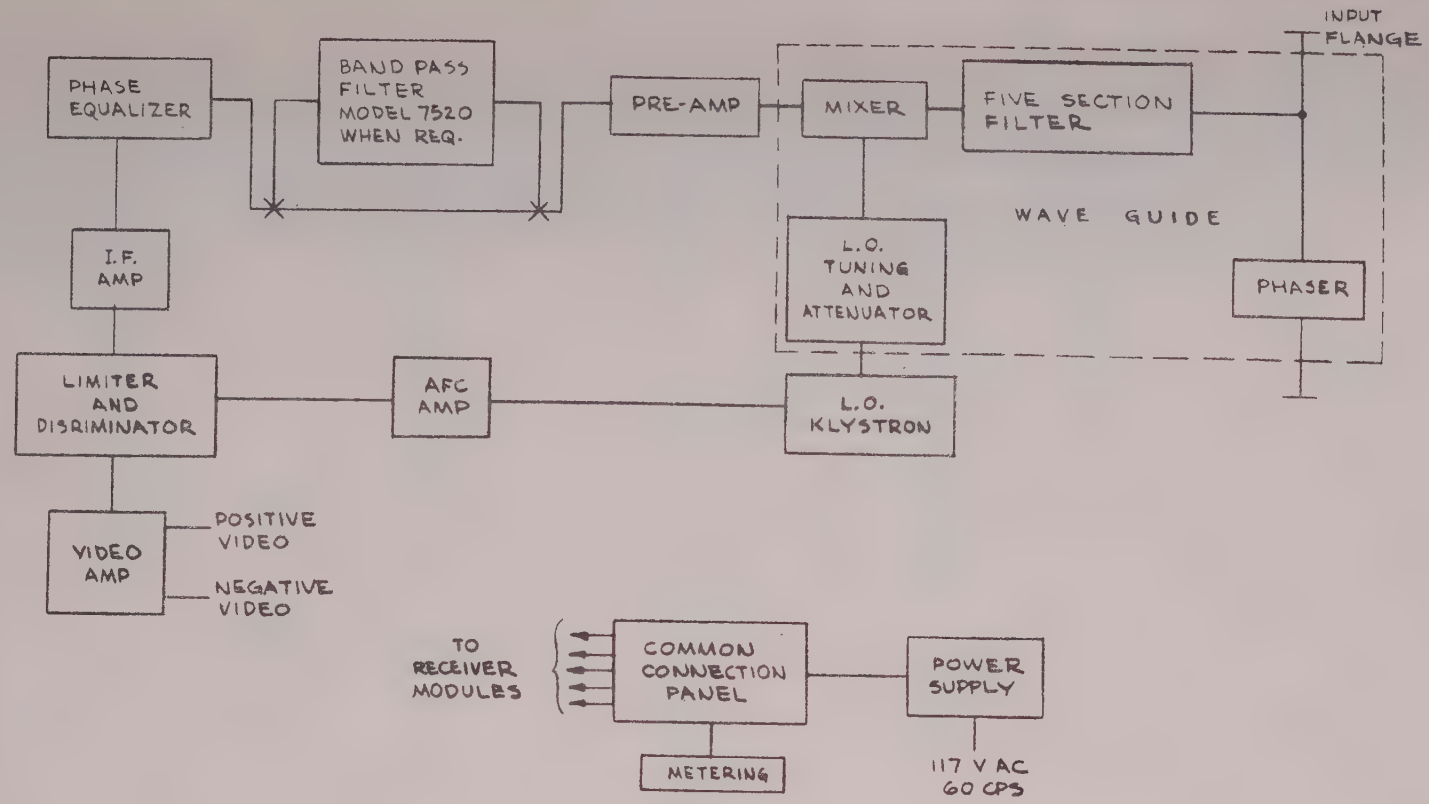
A voltage doubler is also used for the klystron repeller supply. The voltage developed at the output of the doubler circuit is 1200V. Dropping resistors are used to limit current through a corona discharge tube which is used to regulate the klystron repeller supply. The top end of the corona discharge tube is connected to the repeller control potentiometer in the common connection panel. The low voltage end of the corona discharge tube is returned to the output cathode of the AFC cathode follower.

The negative supply for the AGC and AFC circuits is obtained from the -300V supply. Since the current drain on the negative supply is only of the order of 20ma, a simple voltage regulator tube is used for regulation. The dropping resistor from the -300V to negative supply is chosen to limit the current through the VR tube to 20ma under normal operating conditions.

A second saturating type transformer is used to provide the B+ and filament voltage for all receiver tubes. A V.R. tube regulated +105V is also provided as a B+ source for the AFC amplifier. A full wave rectifier is used to feed a choke input LC filter. The output of this section is fused and fed to two LC filter sections. One of these sections has high current capability and provides the B+ for all but two tubes in the video amplifier. The second filter section provides B+ for two tubes in the front end of the video amplifier. This is done to provide B+ decoupling for the video amplifier to reduce low frequency feedback effects.

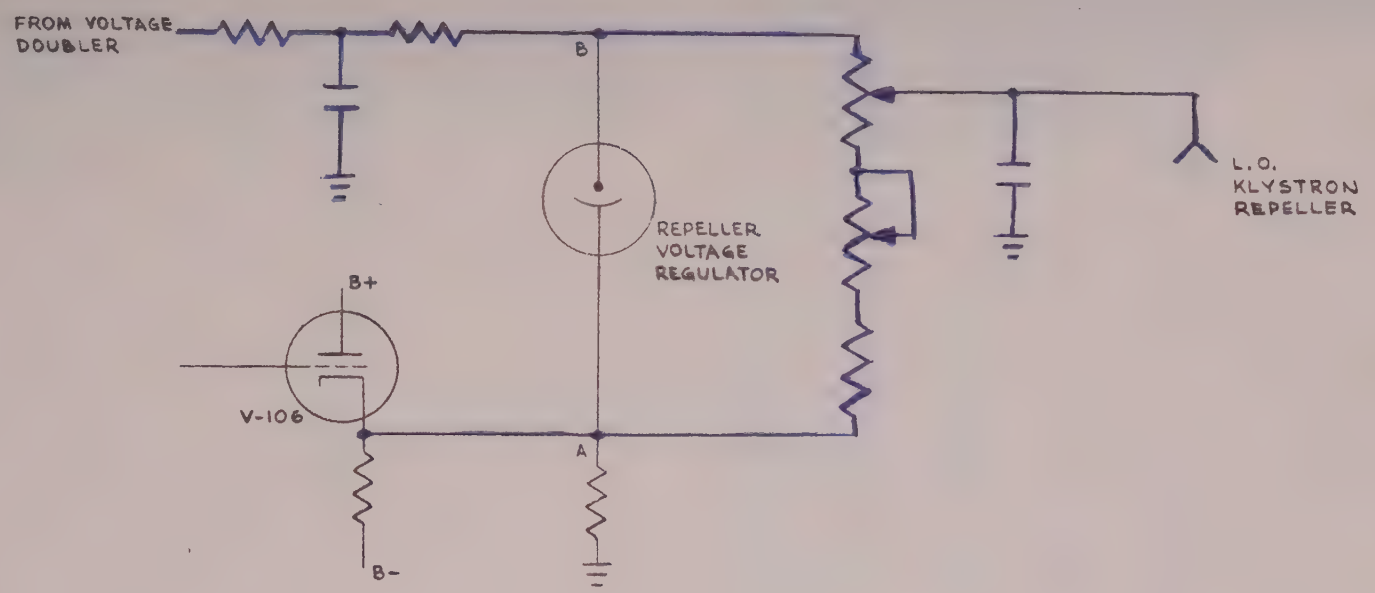
A 105V VR tube is used to provide a positive supply for the AFC amplifier. The AFC amplifier is given separate regulation to stabilize the drift of the AFC DC amplifier.

Fuses are provided in the -300, B+, B$^-$, and filament supplies for circuit protection.



RECEIVER BLOCK DIAGRAM

FIG. A



SIMPLIFIED SCHEMATIC
REPELLER VOLTAGE CONTROL AND AFC
FIG. B

MICROWAVE RECEIVER

MODEL RM-68

EQUIPMENT MAINTENANCE

PRELIMINARY NOTES

I. Hazardous high voltages and super high frequency radiations are present in this equipment. Avoid direct contact with high voltage terminals.

II. Maintenance work should be carried out only by qualified personnel.

III. Allow 3 - 4 hours for warm-up of the equipment before making tests.

IV. For preventive maintenance purposes, it is recommended that periodic routine checks be made, with results listed and compared with previous tests. In this way, gradual failures, such as occur when tube cathodes lose emittance, can be prevented and tubes replaced before outages occur.

CHART OF CONTROLS - RECEIVER MODEL RM-68

1. FRONT PANEL

CONTROL	SCHEMATIC DESIGNATION	TYPE	FUNCTION
EQUENCY OARSE	R504	Potentiometer	Coarse electronic tuning of local oscillator frequency.
NE	R505	Potentiometer	Fine electronic tuning of local oscillator frequency.
L AFC OFF	SW505	2-Pos. Switch (Axial on R505)	Disconnects AFC circuit.
DEO OUTPUT LEVEL	R119	Potentiometer	Adjusts output of video amplifier to operational level.
TERING LECTOR	SW503 (Top)	Rotary Switch	NOTE: Both switches are used in conjunction with each other for monitoring voltages and currents as follows:
	SW504 (Bottom)	Rotary Switch	

POSITION OF SW503	POSITION OF SW504	MONITORS
POWER SUPPLY	1	+150V supply
	2	-150V supply
	3	Klystron filament voltage
	4	Beam current
	5	Beam voltage
	6	+105V supply
AFC	1	V101 cathode voltage
	2	V102 cathode voltage
	3	V103 cathode voltage
	4	AFC error
	5	AFC correction
	6	Repeller voltage
I.F.	1	V201 cathode voltage
	2	V202 cathode voltage
	3	V203 cathode voltage
	4	V204 cathode voltage
	5	V205 cathode voltage
	6	AGC voltage
PREAMP	1	V401 cathode voltage
	2	V402 cathode voltage
	3	V403 cathode voltage
	4	1N23C mixer crystal current
	5	Open
	6	Open

POSITION OF SW503	POSITION OF SW504	MONITORS
VIDEO AMP	1	V301 cathode voltage
	2	V302-A cathode voltage
	3	V302-B cathode voltage
	4	V303 cathode voltage
	5	Open
	6	Open
LINE	-	AC line voltage

2. POWER SUPPLY FRONT PANEL

ONTROL	SCHEMATIC DESIGNATION	TYPE	FUNCTION
OWER ON	SW601	SPST Switch	Energizes the equipment from AC line.
LYSTRON ILAMENT OLTAGE	R608	Rheostat	Increases or decreases klystron filament voltage.
EAM ON	SW602	SPST Switch	Controls beam voltage to klystron.
EAM OLTAGE	R612	Potentiometer	Increases or decreases klystron beam voltage.

3. COMMON CONNECTION PANEL

NTROL	SCHEMATIC DESIGNATION	TYPE	FUNCTION
02	R502	Potentiometer	Set meter (AFC Pos. 4) to zero on 10-0-10 scale with limiter power switch OFF.
01	R501	Potentiometer	AGC meter calibrate. Adjust after IF level has been set.
UELCH T	R503	Potentiometer	Sets turnover point of squelch relay.
MITER WER	SW501	SPST Switch	Removes B+ from limiter and disc. driver stage. (Initial set up)
C UELCH	SW502	SPST Switch	Connects and disconnects squelch relay from squelch driver. Prevents disabling of AFC circuit under squelch conditions.
27	R527	Rheostat	Factory adjust. Klystron beam current metering shunt.

4. DISCRIMINATOR AND AFC CHASSIS

35	R135	Potentiometer	Adjusts balance of AFC amplifier. Set to +1 on 10-0-10 scale (AFC Pos. #5) with AFC in OFF position.

5. IF AMPLIFIER

4	R244	Potentiometer	Adjusts level of IF output. 0.7V RMS at J203. Must be adjusted with carrier input level of at least -80dbw with an unmodulated carrier.

6. VIDEO AMPLIFIER

EO ELCH	SW301	SPST Switch	Video squelch control. In the OFF position the video amp is not cut off under squelch conditions.

POWER SUPPLY CHASSIS

METERING SELECTORS POSITIONS

SECTION	POSITION	NORMAL READING	HIGH READING	LOW READING	NO READING
"POWER"	1 B+	150	Check for loose cables to modules which supply load voltage. Check for burned out tubes which cause low load on supply voltage.	Check C610,611 for leakage. Check for shorted tubes. Check for open SIR613,614,615, or 616.	Check FS603. Check line voltage. Check interconnecting cables.
"POWER"	2 B-	-150	Check V605	Check for excessive load in IF strip or AFC strip. Check 300V supply.	Check FS604. Check interconnecting cable.
"POWER"	3 Klystron Filament Voltage	6.3	Check for open klystron heater. Check for open lead to klystron plug. Check for incorrect setting of R608.	Adjust R608. Check CR-617,618. Check C607,608 and 609.	Check FS601 and interconnecting cables.
"POWER"	4 Beam Current	30 (mA)	Check 300V supply. Check high heater voltage.	Check low beam voltage, low heater voltage. Check for bad klystron.	Check FS604, V601, interconnecting cable. Check beam power relay circuit. Check rectifiers and capacitors in high voltage supply circuit.

POWER SUPPLY CHASSIS

METERING SELECTORS POSITIONS

SECTION	POSITION	NORMAL READING	HIGH READING	LOW READING	NO READING
"POWER"	5 Beam Voltage	300	Check V601,602, 603. Adjust R612.	Same as high reading.	Check V601,602, 603. Check interconnecting cables; rectifiers and capacitors in high voltage circuit.
"POWER"	6 +105	105	Check V604	Check for excessive load in AFC Amp. Check +150 supply	Check FS603. Check R618. Check interconnecting cable.
			AFC CHASSIS		
"AFC"	1 E_k of V-101 (E180F/ 6688)	See TEST MEASUREMENTS DATA CHART	Check for shorted V101. Check for open R102,103.	Check for bad V101. Check for low plate voltage on V101.	Check for burned out V101.
"AFC"	2 E_k of V-102 (12BY7/ 7753)	See TEST MEASUREMENTS DATA CHART	Check for shorted V102, open resistors R108 & R145, leaky C129.	Check for bad V102, open R111	Check for burned out V102.
"AFC"	3 E_k of V-103 (6CL6/ 6677)	See TEST MEASUREMENTS DATA CHART.	Check for shorted V103.	Check for bad V103, open R118.	Check for burned out V103.

METERING SELECTORS
POSITIONS

SECTION	POSITION	NORMAL READING	
"AFC"	4 AFC ERROR VOLTAGE	10-0-10	NOTE 1. The voltage at this point corresponds to the center frequency of a received signal. If this signal is received at the proper center frequency, the voltage will read mid-scale on the meter. If the SIGNAL LEVEL pilot lights indicate reception of a signal, but no indication of change in AFC error voltage is obtained by varying R504, AFC OFF, tubes V101 and V102 should be checked for defects. For this check, switch SW501 on the common connection panel must be in "ON" position. To calibrate the 10-0-10 scale proceed as follows: pull AFC switch SW505 to OFF position, set switch SW501 to OFF position and adjust AFC ZERO control R502 to achieve a center scale reading. Return SW501 to ON position and rotate COARSE control R504; this should produce AFC error on either side of 0 as the control is tuned to one side or other of the correct frequency.
"AFC"	5 AFC CORRECTION VOLTAGE	10-0-10	NOTE 2. These metering selector positions monitor the output of the AFC amplifier on an 0 center scale. To check adjustments on this scale, go through procedure given above for setting AFC error to 0. Be sure that signal is being received and that R504 is set correctly for 0 center scale reading. With AFC "OFF", the output of the AFC amplifier should now read 0. If it does not, check the setting of AFC BALANCE control R135 on AFC chassis. If balance cannot be achieved, check tubes V104, V105 and V106. If balance is achieved, press SW501 to ON position and rotate R504 left or right. This introduces an error in the klystron frequency that will be corrected by a change in repeller voltage furnished by the AFC amplifier. Hence, the meter should indicate a deflection either to the right or the left while the klystron is mistuned to one side or the other. Front panel lights must indicate signal above threshold for this check. If the meter still does not indicate a deflection, check tubes V104,105 & 106.

AFC CHASSIS

METERING SELECTORS POSITIONS

SECTION	POSITION	NORMAL READING	HIGH READING	LOW READING	NO READING
"AFC"	6 REPELLER VOLTAGE	See TEST MEASUREMENTS DATA CHART	Adjust R504	Adjust R504; check for leaky C501; check for bad CR501; check for bad klystron; check V606 in power supply.	Check diodes CR607 thru CR612; check interconnecting cables; check for short in V606 of power supply; check R507, 510 and 511 for open.
			I.F. AMPLIFIER CHASSIS		
"I.F."	1 E_k of V-201	See TEST MEASUREMENTS DATA CHART	Check for short in V201	Weak tube V201.	V201 burned out.
"I.F."	2 E_k of V-202	See TEST MEASUREMENTS DATA CHART	Check for short in V202; check for leaky C208.	Weak tube V202.	V202 burned out.
"I.F."	3 E_k of V-203	See TEST MEASUREMENTS DATA CHART	Check for short in V203; leaky C215	Weak tube V203.	V203 burned out.

NOTE 3.
As all of these tubes (V201 thru V203) are subjected to automatic gain control voltage in the presence of received signal, the readings of E_k will vary with signal level. Hence, in order for these readings to be meaningful, they must be made at a known signal level. If all tubes exhibit either high or low readings, it is possible that the source of the trouble is an improper signal level rather than a defective tube circuit in the I.F. amplifier chassis.

I.F. AMPLIFIER CHASSIS

METERING SELECTORS POSITIONS

SECTION	POSITION	NORMAL READING	HIGH READING	LOW READING	NO READING
"I.F."	4 E_k of V-204	See TEST MEASUREMENTS DATA CHART	Check for short in V204; leaky C224.	Weak tube V204.	V204 burned out.
"I.F."	5 E_k of V-205	See TEST MEASUREMENTS DATA CHART	Check for short in V205; leaky C232.	Weak tube V205.	V205 burned out.
"I.F."	6 AGC	See TEST MEASUREMENTS DATA CHART	NOTE 4. The voltage read on this position of the metering selector switches indicates the RF receive level. Each receiver comes supplied with a factory calibration which interprets this reading in dbw of received power. Two controls affect this reading: (1) R501, which is mounted on the chassis of the common connection panel. It is set to produce a zero reading on the meter in the absence of receive signal. (2) R244 mounted on the I.F. Amplifier Chassis and is set for an output level of 0.70 volts rms of the I.F. signal as measured with a field strength meter. If the meter reading for AGC position is suspected, R501 and R244 should be checked first. If correct output voltage from I.F. strip, as measured with a field strength meter, is obtained, but the AGC reading remains incorrect, it is possible that one or more of tubes V201 thru V205 are weak. Also check the AGC amplifier V206.		

PREAMPLIFIER CHASSIS

METERING SELECTORS
POSITIONS

SECTION	POSITION	NORMAL READING	HIGH READING	LOW READING	NO READING
"PRE AMP"	1 E_k of V-401	See TEST MEASUREMENTS DATA CHART	Check for shorted V401, open R403 or shorted R402.	Check for weak V401, shorted R403, open R402.	V401 burned out.
"PRE AMP"	2 E_k of V-402	See TEST MEASUREMENTS DATA CHART	Check for shorted V402, leaky C416.	Check for weak V402	V402 burned out.
"PRE AMP"	3 E_k of V-403	See TEST MEASUREMENTS DATA CHART	Check for shorted V403, leaky C427. NOTE 5. Similar to the tubes in the I.F. strip, V402 and V403 too are subject to AGC voltage, and Note 4 applies also to these two tubes.	Check for weak V403.	V403 burned out.
"PRE AMP"	4 1N23C	See TEST MEASUREMENTS DATA CHART	Check position of waveguide attenuator for proper crystal current.	Check klystron tuning; check position of waveguide attenuator; check for bad crystal.	Check for bad crystal; check local oscillator.

VIDEO AMPLIFIER CHASSIS

METERING SELECTORS POSITIONS

SECTION	POSITION	NORMAL READING	HIGH READING	LOW READING	NO READING
"VIDEO AMP"	1 E_k of V301	See TEST MEASUREMENTS DATA CHART	Check setting of video output level potentiometer R119. E_k of V301 varies with that setting. For very high reading check for shorted V301	Check setting of R119.	Check for bad V301, or open plate supply, shorted C303.
"VIDEO AMP"	2 E_k of V-302A	See TEST MEASUREMENTS DATA CHART	Check for leaky C304 or C305; check for shorted V302A.	Check for weak V302A	Check for open plate supply, R307, R311, L303; check for shorted C303B; check for burned out V302A
"VIDEO AMP"	3 E_k of V-302B	See TEST MEASUREMENTS DATA CHART	Check for leaky C307, C308; check for short V302B.	Check for weak V302B.	Check for open plate supply, R319, L304; check for shorted C303; check for burned out V302B.
"VIDEO AMP"	4 E_k of V-303	See TEST MEASUREMENTS DATA CHART	Check for leaky C312, C313, open R325; check for short in V303.	Check for weak V303, shorted R325	Check for burned out V303.
		LINE VOLTAGE CHECK			
"LINE"	Any position	105 to 130	Check A.C. power source	Check A.C. power source	Check R526 and CR502 in common connection panel chassis; check interunit cabling.

REPLACEMENT OF RECEIVER KLYSTRON

GENERAL

The klystron local oscillator for the receiver is seated in an octal socket located in a notch in the common connection panel on the left hand side of the unit. The type and serial number of the tube installed in each individual unit is quoted for each manual. In some cases, more than one type of tube could be used for this replacement, but it will be easiest to replace the tube by the same type as the original one.

PROCEDURE

1. Turn off the beam voltage and AC power.

2. Unplug the repeller cap from the top of the tube and remove the tube from its socket. Note that there is a long pin on the tube which is its RF output connector. This pin engages the socket which is well within the common connection panel. In installing the tube it is important that this pin be handled carefully. It is actually a piece of coaxial cable. Note the tuning bows on the tube. These are the two bowed pieces of flat metal through which the tuning screw goes.

3. Observe the position of this tuning screw on the tube removed from the unit and mechanically tune the replacement tube so that its tuning screw will be in the same position, both as to number of turns and as to position of the square end of the adjustment screw.

4. Flex the bows several times by tuning the tube on both sides of this adjust position by approximately a half turn, and wind up leaving the tuner screw in the proper position.

5. Plug the new tube into the octal socket, seating the tube well down.

6. Plug the repeller cap on top of the tube.

7. Turn on the main power switch and check the klystron filament voltage, beam voltage, and repeller voltage. If the filament voltage is not 6.3V, adjust by turning the KLYSTRON FILAMENT rheostat on the front panel of the power supply. The beam voltage should be the same as that of the old tube (300V), and the repeller voltage should be adjusted to the same voltage used in the previous tube with the AFC in "OFF" position.

8. Allow approximately fifteen minutes warm-up time for the new tube.

9. Turn the beam switch on the power supply to the ON position. There is a one minute time delay which will start when this switch is turned on. After one minute the beam voltage should come on.

10. With the beam voltage on, check the beam current. It should be approximately the same value as for the previous tube, if the tube is oscillating. If the tube is not oscillating, the beam current is slightly low. This effect can be observed by tuning the repeller voltage adjustment knob slowly about its original position. The current reading changes slowly. Fast adjustment of the repeller knob could result in tuning through the proper position so fast that this slight change of beam current would not be seen.

11. Turn the switches on the front panel to the current position to read "crystal mixer current". Crystal current is read by turning the selector switches to preamp section and position 4.

12. No crystal current observed in this position indicates that the klystron is not oscillating, or that it is oscillating at the wrong frequency.

13. Check this by slowly turning the repeller voltage knob to right and left of the original position which gave the recorded repeller voltage.

14. If no oscillation is observed, slowly tune the mechanical adjustment of the klystron by turning first to one side of its original position and then to the other side and for each new position of this mechanical adjustment screw turn the repeller voltage through the range to give the tube a chance to oscillate.

15. On the position where oscillation is noted, peak the mechanical tuning and the repeller voltage adjust for maximum crystal current. The crystal current should come up at least to the value given on the original test sheets.

16. If the replaced klystron has been in service for a long time, the attenuator card in the local oscillator leg of the plumbing may have been adjusted to work with less local oscillator power. If this is the case, the crystal current read with the new klystron installed may be substantially above that which the old klystron provided.

17. After the mechanical adjust and the repeller voltage adjustment have both been peaked, again check the mechanical position of the tuning adjustment on the klystron. It should be very nearly in the same position as that of the old klystron.

18. If there is now RF input signal to the receiver, the receiver should show above threshold on its signal lights, and the AFC circuit should show AFC error voltage if the klystron is not precisely on frequency.

19. With signal into the RF input of the receiver, turn on the AFC circuit by pushing the AFC switch on the front panel in; adjust the repeller voltage adjustment knob for zero AFC correction (AFC section position number 5).

20. Switch the meter to read crystal current in preamp section, (position number 4) and make final peaking adjustment of the klystron by maximizing this current while the AFC circuit holds the receiver on frequency.

21. Return to the AFC correction position and again move the correction down to zero by making repeller adjustment with repeller control knob.

22. If, after that, the crystal current is above or below the value given on the factory test sheet, effect correction by adjusting the attenuator in the bottom of the receiver plumbing section. Make attenuator adjustments in slow steps and when a correct position is found be sure to lock the attenuator in place, so that it will not vibrate out of position.

MICROWAVE RECEIVER
MODEL RM-68
WAVEGUIDE ASSEMBLY ALIGNMENT

Under normal conditions no alignment of the waveguide assembly is required in the initial installation.

Where the initial installation consists of more than one receiver in a multi-channel arrangement, the phasors in the vertical risers will have been preset at the factory and no field adjustment will be required if the proposed racking arrangement is followed. When additional receivers are added at a later date in a field installation, the following phasor adjustment procedure is recommended:

1. Place all front panel meters on IF Pos. #6.
2. Adjust the phasor of the lowest receiver in the rack for maximum meter reading.
3. Adjust the phasor of the next receiver up in the rack for maximum meter reading.
4. Adjust the phasor of the third receiver up in the rack for max. meter reading.
5. Phasors are adjusted in this fashion until the top receiver is received.
6. The procedure from steps 2 thru 5 should be repeated at least 3 times with the phasors being locked in place on the last adjustment.

Procedure for alignment of a waveguide assembly to a new frequency:

Test Equipment:

684B	HP	Sweep Generator
J532A	HP	Wavemeter
J375A	HP	Attenuator
J281A	HP	Waveguide to Coax Adapter
428A	HP	Detector Mount
D-86	Jerrold	RF Detector
122A	HP	Oscilloscope
RF-1	Heathkit	R.F. Signal Generator

1. Set up the test equipment and filter as shown in figure 1.
2. Connect the detector mount and coax to waveguide adapter to point "A". Detector output connected to scope.
3. Tune the wavemeter to the desired frequency.
4. Turn on sweep generator.

5. Set sweep bandwidth to 130MC. Set frequency until marker notch is seen on scope display.

6. Adjust attenuator until a reference amplitude display is obtained on most sensitive scale of scope.

7. Tune 1st section (nearest vertical riser) of filter until its reflection is seen under the wavemeter frequency. (Turning plunger into waveguide lowers the resonant frequency.)

8. Tune the 2nd section until the wavemeter marker is between the two reflections.

9. Tune the 3rd (or middle) section until the absorption marker is on the peak of the 3rd "reflection".

10. Tune the 4th section such that four peaks or "reflections" are observed and the wavemeter notch falls in the middle of the four peaks.

11. Tune the 5th or last section such that five peaks are observed with the 5th peak under the wavemeter marker.

12. Remove the coax to waveguide adapter and replace with a shorting plate.

13. Connect the oscilloscope directly to IF output J703.

14. Disconnect the filter from the test equipment and connect the coax to waveguide adapter to the test equipment.

15. Using the L.O. cable from the common connection panel, insert the sweep from the test equipment at J704.

16. Set the wavemeter to the L.O. frequency. (Generally 75MC above the incoming carrier.)

17. Tune the L.O. filter section until a single tuned bandpass response is observed.

18. Disconnect the L.O. cable from the test equipment and connect to the L.O. mount in the common connection panel.

19. Reconnect the filter assembly to the RF test equipment as shown in figure 1.

    The oscilloscope is now connected to J703 through the detector D-86.

20. The mixer current should be adjusted to approximately 1ma with the waveguide L.O. attenuator.

21. A bandpass presentation should now be observed on the oscilloscope. The wavemeter should be set to the waveguide input frequency and should appear in the center of the bandpass response. The Heath RF signal generator should be set to 75MC.

22. The repeller voltage should be adjusted to place 75MC marker in the wavemeter notch of the absorption wavemeter.

23. Adjust the phasor in the vertical riser for maximum response. Also adjust the sliding short for max. response.

24. Peak all sections of the filter for best response, approximately 30MC wide at 1 db points.

25. If at all possible, retuning of the waveguide assembly should not be done in the field. Rather, a new waveguide assembly should be requested from the manufacturer. This will be properly tuned to the proper frequency and shipped ready for installation.

MICROWAVE RECEIVER
MODEL RM-68
PRE-AMPLIFIER ALIGNMENT

1. Set up the test as shown in figure 2. If necessary, a jumper cable may be used to remove the unit from the drawer to facilitate servicing.

2. Connect the test jig, fig. 4, to the cable at point "A", fig. 2. Connect point "C" of the jig to pin 2 of V-403. Set Cm-11 on 10MC markers.

3. Adjust L-415, L-416 and C-432 to obtain the response shown in figure 5.

4. Set up as shown in figure 3. Connect end of the delay line to J-402. Adjust L-417, L-418 and C-434 to obtain match pattern as shown in figure 6. Return loss to be at least 20 db. (Note scope deflection.)

5. Check magnitude of return loss by terminating the delay line in a variable attenuator and adjusting the attenuator until the scope deflection is equal to the deflection obtained in step 4. The attenuation setting of the attenuator multiplied by 2 gives the return loss directly in db.

6. Connect the delay line to J-401 and adjust L-401, L-402, L-403 and C-401 for input match. Return loss to be at least 16 db. (Use same procedure as in step 5.)

7. Set up as in figure 2 to determine amplifier response from J-401 to J-402.

8. Adjust the overall response of the amplifier for the band-pass as shown in figure 7.

   Adjustments are as follows:

L-413	Bandwidth of broad
L-411	Plate tuning of broad
L-412	Grid tuning of broad
L-414	Variable loading of broad
L-410	Bandwidth of fill
L-407	Plate tuning of fill
L-409	Grid tuning of fill
L-408	Variable loading of fill
L-406	Broad peak about 75MC

9. Care should be taken in tuning the amplifier to obtain a 4 peak response. Care must also be taken to assure that the narrow "fill" sections are tuned to control the center peaks of the response curve, and that the broad sections are tuned to control the peaks on the edge of the response curve.

10. Overall pre-amplifier gain, R-244 on the main IF amplifier must be rotated completely clockwise, set scope on max. sensitivity.
Adjust variable attenuator such that a reference amplitude display is established. Note the attenuator setting.

11. Remove the amplifier and connect the variable attenuator output point "A" directly to the detector. Adjust attenuator to return to the reference display amplitude. Note attenuator setting.

12. Difference in attenuator settings of steps 10 and 11 is the gain of the amplifier. The minimum gain is 40 db.

MICROWAVE RECEIVER
MODEL RM-68
MAIN IF AMPLIFIER ALIGNMENT

1. Set up test as shown in figure 2. Rotate R-244 fully clockwise.

2. Connect the test jig to the cable at point "A". Remove unit cover and connect point "C" of the jig to pin 2 of V-205. Set Cm-11 on 10mc.

3. Adjust L-220, L-221 and C-243 for response as shown in figure 5.

4. Set up as shown in figure 3. Connect end of delay line (D) to J-202. Adjust L-222, L-223 and C-245 for match response as shown in figure 6. Return loss not less than 20 db.

5. Connect delay line (D) to J-201 and adjust input match. Adjust C-201, L-201, L-202 and L-203. Return loss not less than 20 db. (See Step 5 in Pre-Amp alignment.)

6. Set up as in figure 2 and adjust response of last two interstage networks. Connect test jig at point A, and connect to pin 2 of V-203. Adjust interstages to obtain response of figure 7.

Controls are as follows:

L-217	Bandwidth of broad
L-216	Plate tuning of broad
L-218	Grid tuning of broad
L-219	Variable grid loading
L-213	Bandwidth of fill
L-212	Plate tuning of fill
L-214	Grid tuning of fill
L-215	Variable grid tuning

7. Step 9 of Pre-Amplifier alignment applies here also.

8. Connect jig to point "B" of test set up fig. 2. Connect point "C" of jig to pin 9 of V-203. Connect point "A" to J-201. Adjust first two interstages for response of fig. 7.

Controls are as follows:

L-209	Bandwidth of broad
L-208	Plate tuning of broad
L-210	Grid tuning of broad
L-211	Variable grid loading
L-205	Bandwidth of fill
L-204	Plate tuning of fill
L-206	Grid tuning of fill
L-207	Variable grid loading

9. Step 9 of Pre-Amplifier alignment applies here also.

10. Remove test jig and replace cover on unit.

11. Insert sweep into the amplifier at J-201 at a level of 15MV RMS/75 ohms. Measure level with Jerrold Field Strength Meter model 704B. Sweep bandwidth must be at zero and blanking off for level measurement.

12. Adjust R-244 for an IF output level of .7V RMS/75 ohms at J-202.

13. Connect detector point "B" (Fig. 1) to J-202. Increase sweep bandwidth to observe center 30mc of IF passband.

14. Adjust plate circuit of V-202 and V-203 to obtain a four peaked response as shown in figure 7. Ripple should not exceed .5 db total. Only minor touch-up should be required.

15. Measure gain of IF as described in steps 10, 11, and 12 of the Pre-Amplifier alignment procedure.

16. The IF gain should be at least 75 db.

MICROWAVE RECEIVER
MODEL RM-68
DISCRIMINATOR AND AFC ALIGNMENT

1. Set up as shown in figure 3 and connect end of delay line D to J-101.

2. Adjust input match for return loss of 20 db as described in steps 4 and 5 of Pre-Amplifier alignment.

   Controls C-101, L-103, L-102 and L-101 are used to adjust the input match.

3. Insert sweep into J-101 as shown in figure 2. Sweep level should be .7V RMS. Measure level with sweep width zero and blanking off. If this is not possible, drive the Disc & AFC chassis with the IF amplifier.

4. Turn sweep bandwidth to zero and blanking to OFF position. On front panel meter AFC Pos. #4, observe a swing either side of zero when the sweep center frequency is slowly varied either side of 75MC.

5. Front Panel meter to AFC Pos. 5.
   AFC in OFF position.
   Adjust R-135 for zero on 10-0-10 scale.

6. Place AFC in ON pos.
   Set sweep center frequency to approx. 65MC. Front panel meter should read plus or minus 7 on 10-0-10 scale.

7. Place sweep center frequency to approx. 85MC. Front panel meter should read 7 on 10-0-10 scale but opposite in polarity to the reading of step 6.

8. Connect scope to TP-101.
   Set sweep bandwidth to observe entire "S" curve of discriminator.

9. Connect scope to J-101 and observe same presentation as in step 8 but reduced in magnitude. Video output level control must be at max. setting.

MICROWAVE RECEIVER
MODEL RM-68
VIDEO AMPLIFIER ALIGNMENT

1. Set up test as shown in figure 2. Input to J-301, output to J-303.

2. Adjust scope center frequency such that the zero beat of the sweep can be observed on the scope.

3. Adjust sweep bandwidth to approximately 10MC. Use an appropriate signal generator to provide a marker at 8MC, a display approximating figure 8 should be obtained.

4. Controls C-301, L-301 and L-302 are used to adjust the frequency response of the amplifier.

5. Adjust the variable attenuator for a reference amplitude display on scope's most sensitive scale. Note attenuator setting.

6. Remove the amplifier from the set up and connect the attenuator output directly to the RF detector. Remove attenuation until the reference amplitude display is observed. Note attenuator setting.

7. Difference in attenuator setting of steps 5 and 6 is the gain of the amplifier and should be a minimum of 19 db.

8. Check gain using output terminal J-302. Gain should be approximately 16 db. No adjustments should be required for the video response at this output.

MICROWAVE RECEIVER
MODEL RM-68
ALIGNMENT PROCEDURE

GENERAL:

The procedure herein described is to serve as an initial alignment for the receiver. This procedure should also be followed after a new klystron has been installed and properly tuned; following major maintenance; and when troubles are suspected in the AGC and AFC circuits. (Received carrier is assumed.)

AFC ADJUSTMENT

1. Check the power supply reading and adjust the -300V supply.

2. Check the IF output level at J-202. Jerrold Field Strength Meter Model 704B recommended.

3. Adjust R-244 for 0.7V RMS/75 ohms. -4DBM If modulation is present on the incoming carrier the level at J-202 should be adjusted to .58V RMS/75 ohms, this sets the level at J-203.

4. Limiter power SW-501 in OFF position. AFC SW-505 in ON position.

5. Adjust AFC zero, set R-502 to zero center front panel meter on position AFC #4.

6. Limiter power SW-501 in ON position, AFC SW-505 in OFF position. Slight variation in repeller voltage should cause meter swing on each side of zero, leave set on zero.

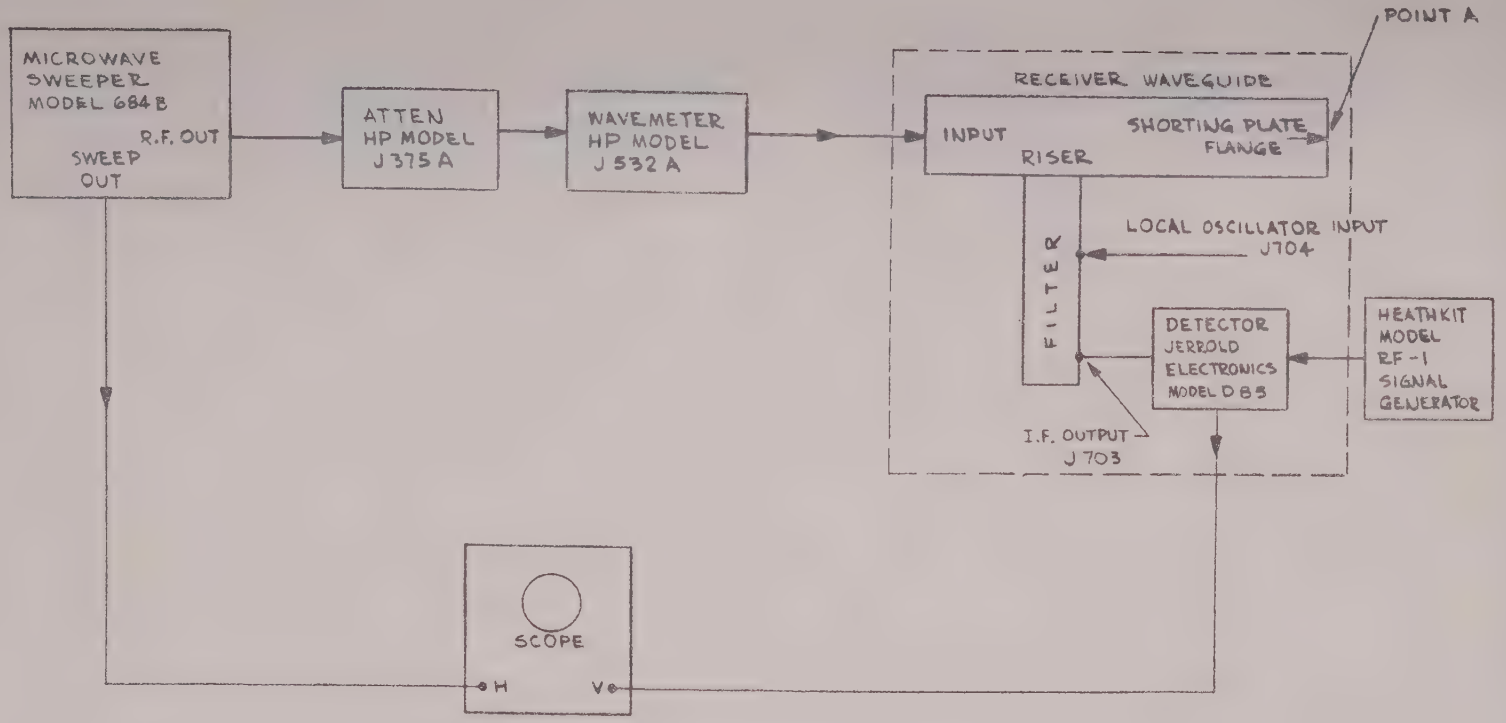
7. Front panel meter position AFC #5. AFC SW-505 in OFF position. Set R-135 on Disc. & AFC chassis to read +1 on 10-0-10 scale.

8. Front panel meter position AFC #4. AFC SW-505 in OFF position. Adjust repeller voltage R-504, R-505 for zero (0) reading on 10-0-10 scale. Swing both sides of zero should be possible.

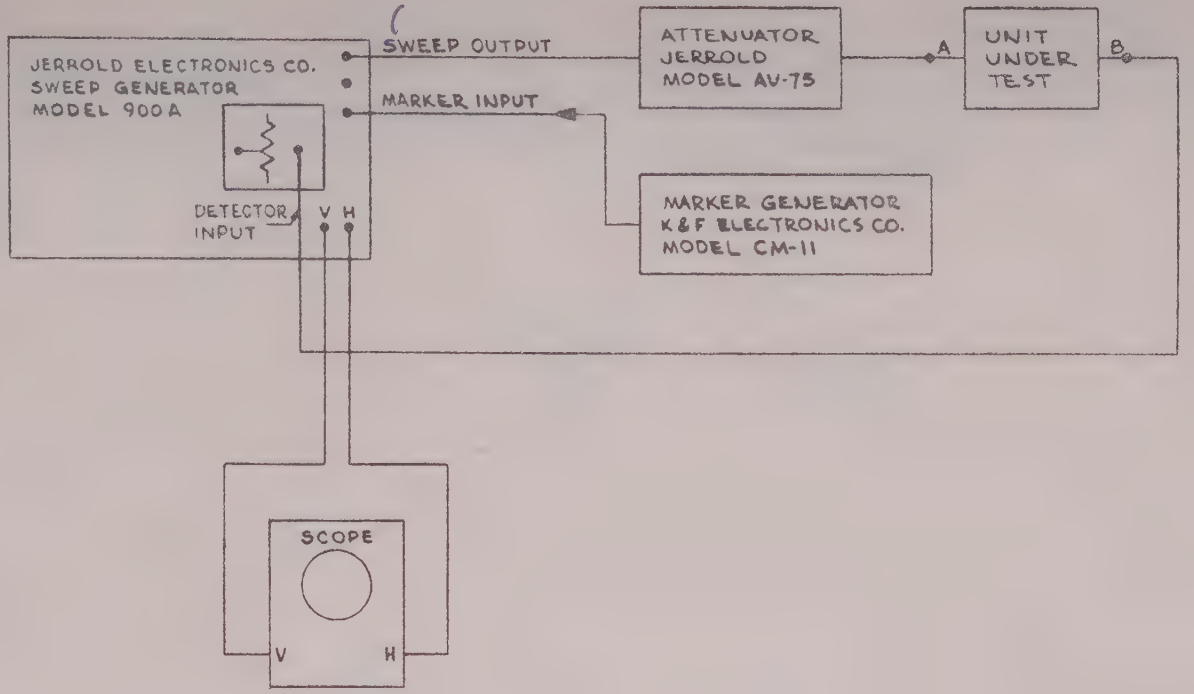
9. Turn on AFC. Slight front panel meter movement may be observed.

10. Front panel meter AFC #5. With AFC ON, a slight variation in repeller voltage should result in a front panel meter movement. This ascertains that the AFC circuit is working properly. Leave repeller voltage such that a meter reading of +1 on 10-0-10 scale is observed.

11. AFC pos. #4. AFC ON. Adjust R-502 for zero reading on 10-0-10 scale. AFC now adjusted properly.

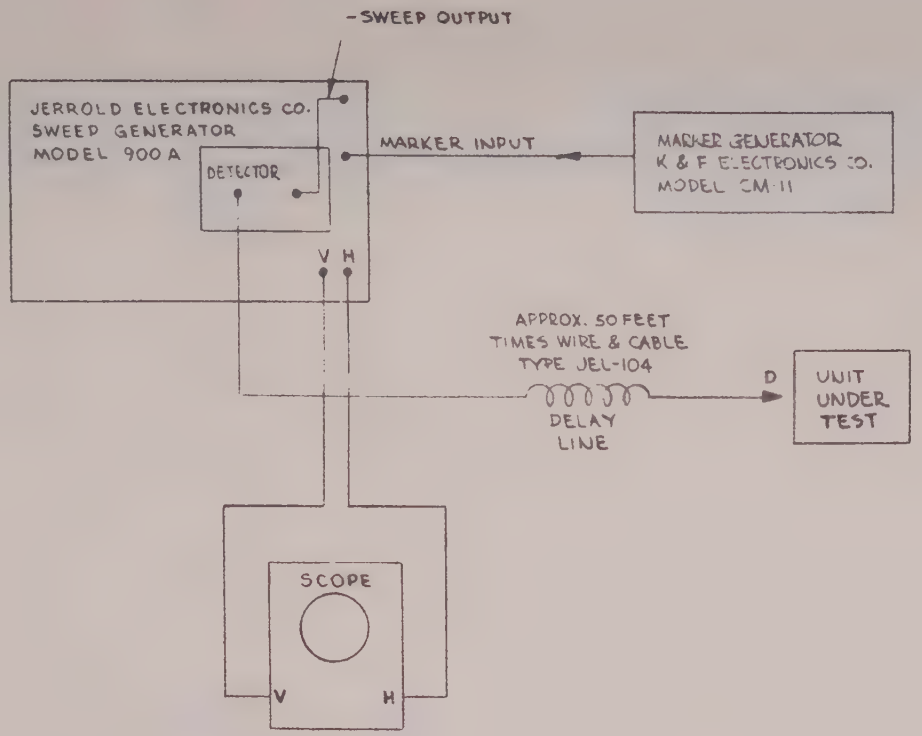


WAVEGUIDE ASSEMBLY
ALIGNMENT
FIG. 1



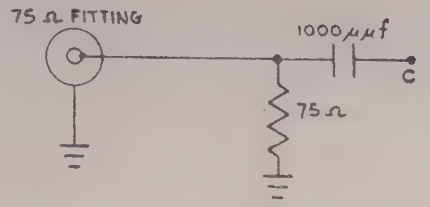
AMPLIFIER RESPONSE TEST SET-UP

FIG 2



INPUT, OUTPUT, MATCH TEST SET-UP

FIG. 3



TEST JIG
FIG. 4

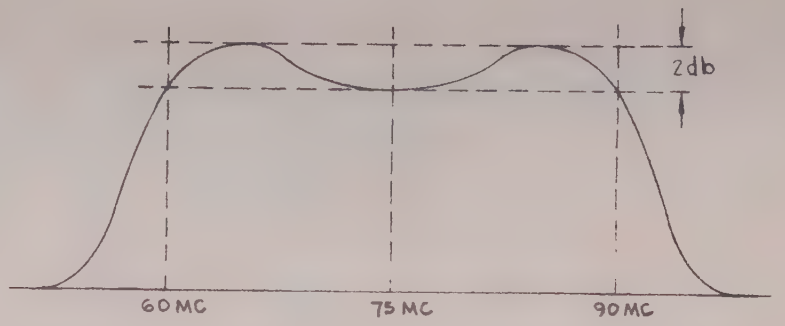
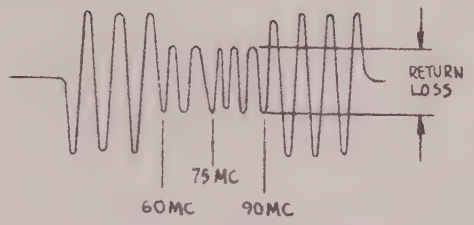
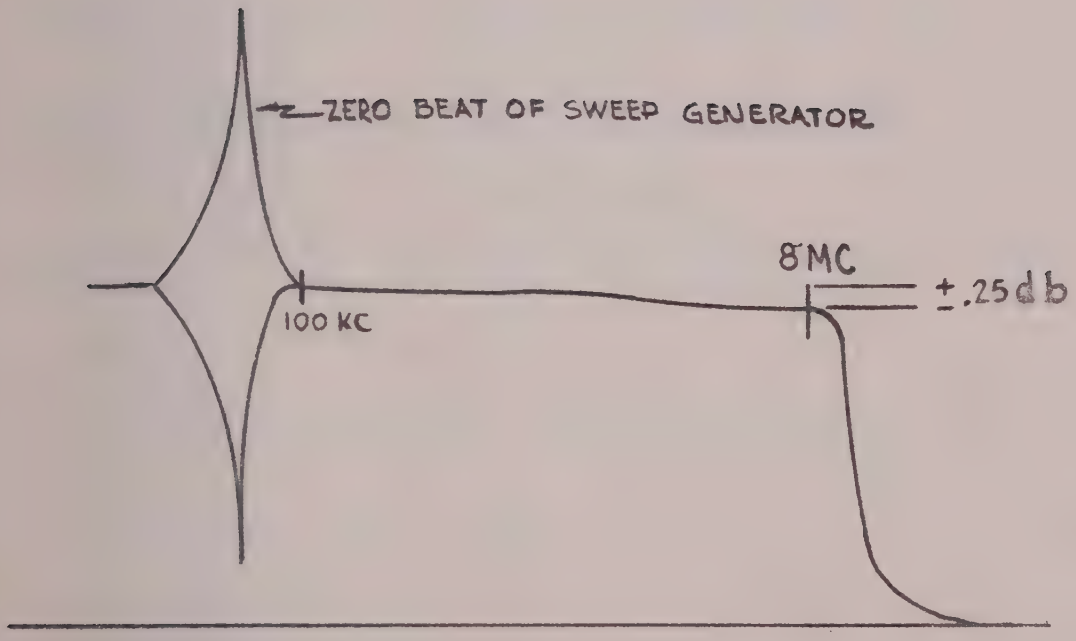


FIG. 5



MATCH PATTERN
FIG. 6

BAND PASS RESPONSE
FIG. 7



VIDEO RESPONSE
FIG. 8

SYSTEM TEST PROCEDURE

DIFFERENTIAL GAIN & PHASE ADJUSTMENT

1. Set up microwave and test equipment as shown in figure 1.

2. Adjust output level of test set oscillator panel for 2 volts peak to peak of composite 60 cps and 3.58 mc/s as shown in figure 2. Levels must be set with the "Test output" terminated in 75 ohms.

2A. Remove Pre & De-Emphasis networks from microwave transmitter and receiver.

3. Connect oscillator panel test output to the negative video input terminal of the microwave transmitter.

4. Turn off the test set 3.58 mc oscillator.

5. Temporarily connect the output of the FD-30 coaxial switches (X) to channel A of the dual trace oscilloscope.

6. Set the Cm-11 for 10 mc markers.

7. Adjust input level control of transmitter until the presentation of figure 3 is obtained. (Set deviation to 10 mc peak to peak.)

8. Turn on test set 3.58 mc/s oscillator.

9. Connect video output of receiver to channel A of oscilloscope and terminate in 75 ohms.

10. Set output level of receiver for 1V peak to peak composite video as shown in figure 4.

11. Reconnect test equipment as shown in figure 1.

12. Set scope inputs on D.C.

13. Adjust the phase equalizer (L-419, L-421, C-418 and C-419) for minimum differential phase as shown in figure 5.

14. Adjust discriminator coils (L-107 and L-108) for minimum differential gain as shown in figure 6. Discriminator limiter coils (L-104, L-105 and L-106) may be adjusted if necessary.

15. Interaction between differential gain and differential phase adjustment may be noted. When this is the case, repeat steps 13 and 14 until the linearity of figures 5 and 6 are obtained.

16. Repeat steps #5 and #6.

17. Adjust the discriminator capacitors (C-102 and C-103) such that the two 10 mc markers are on each end of the trace and visible. This serves to adjust the discriminator crossover.

VIDEO RESPONSE ALIGNMENT

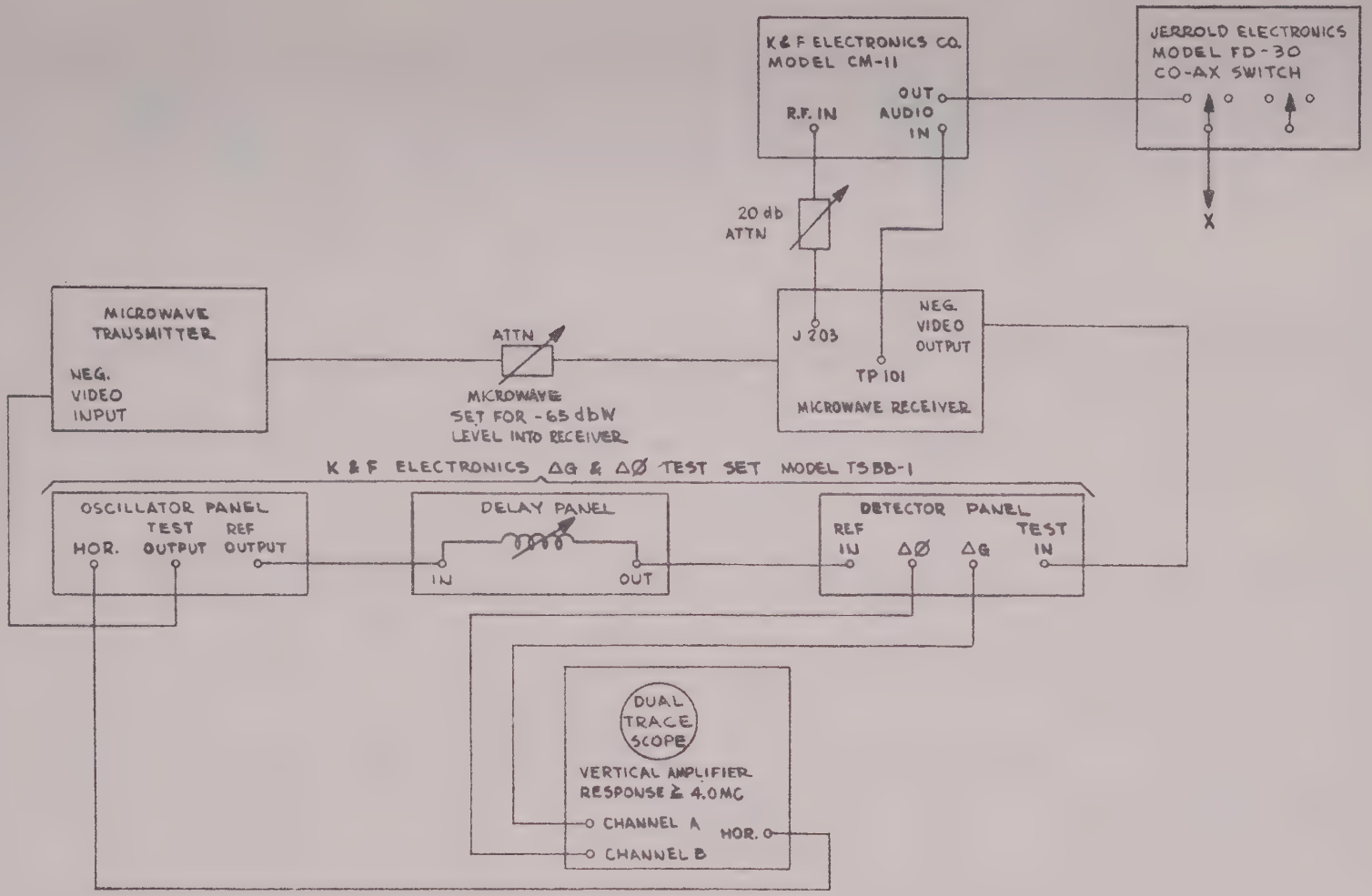
1. Set up microwave and test equipment as shown in figure 7.

2. Adjust transmitter deviation for approximately 5 mc peak to peak.

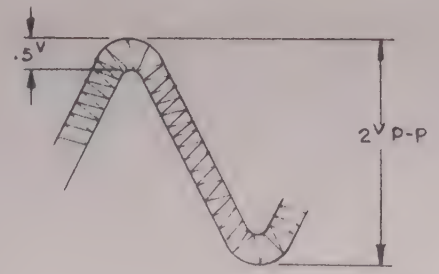
3. Adjust receiver output level for a scope presentation reference amplitude with the scope sensitivity set at maximum.

4. Adjust discriminator cathode follower peaking (L-109) for the presentation shown in figure 8.

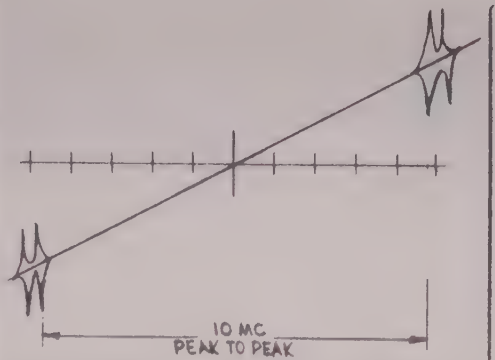
5. If adjustment of L-109 does not yield the proper alignment, video amplifier peaking (C-301, L-301 and L-302) may be adjusted.



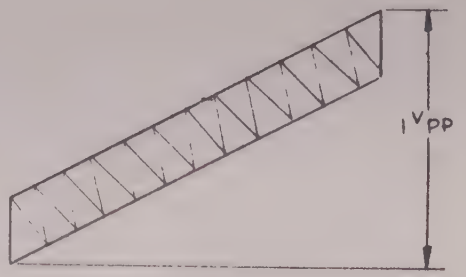
SYSTEM TEST PROCEDURE
FIG. 1



COMPOSITE TEST SIGNAL
FIG. 2



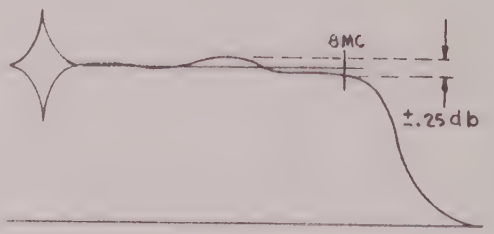
MICROWAVE DEVIATION SET-UP
FIG. 3



COMPOSITE TEST SIGNAL AT
RECEIVER VIDEO OUTPUT
FIG. 4

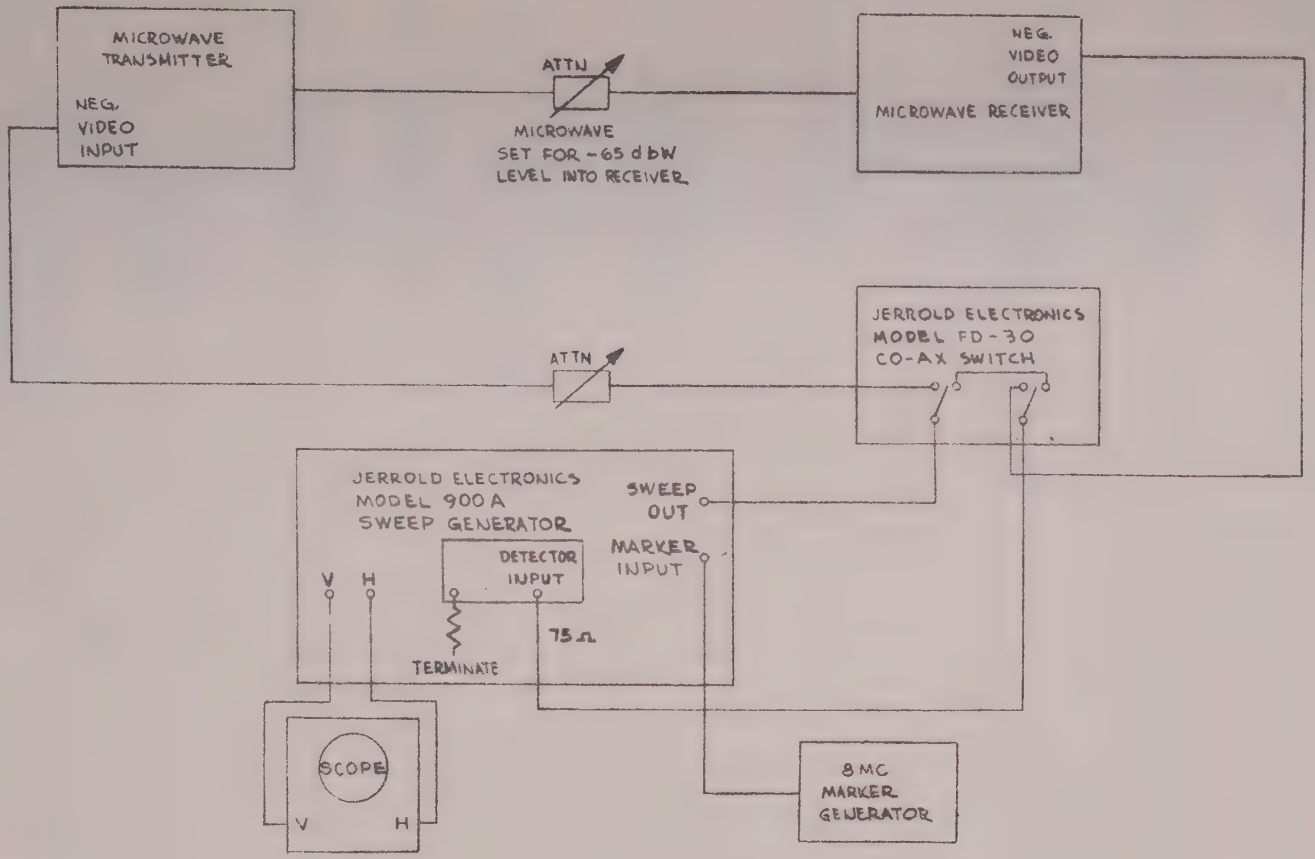
DIFFERENTIAL PHASE PROPERLY
ADJUSTED
FIG. 5

DIFFERENTIAL GAIN PROPERLY
ADJUSTED
FIG. 6



SYSTEM
VIDEO RESPONSE
FIG. 8

SYSTEM TEST PROCEDURE



SYSTEM TEST PROCEDURE

FIG. 7

SYSTEM TEST PROCEDURE

WHITE NOISE BASEBAND LOADING

FREQUENCY DEVIATION CALIBRATION:

1. Set up as shown in figure 1. Turn modulation level control on microwave transmitter fully CCW.

2. Set LM-13 frequency meter to 7.75 MC. Set sweep center frequency and bandwidth to approximately 100MC ±10MC.

3. Scope response should be that shown in figure 2A.

4. Rotate modulation level control on microwave transmitter until the markers move apart to yield the scope response shown in figure 2B.

5. Leave modulation level control at this setting.

WHITE NOISE LOADING

1. Set up as shown in figure 3.

2. Adjust output of noise generator for 600 channel loading (+15 dbm). Refer to page 8, table 2, WHITE NOISE TEST SET OPERATING INSTRUCTIONS.

3. Set Marconi band stop filter unit output attenuator to 20 db.

   NOTE: For transmitter video modulator model 402 high sensitivity input, set attenuator to 45 db.

4. With band stop filters in "out" position, set noise receiver band selector switch to position 2 (70KC).

5. Set noise power ratio DB switches on noise receiver to 20 db, and adjust sensitivity control for a reference reading on the noise receiver meter.

6. Place 70KC filter on the "IN" position, band stop filter unit.

7. Adjust noise receiver "Noise Power Ratio DB" switches on the noise receiver to return to the reference set in step 5.

8. The discriminator coils (L-107 and L-108) of the microwave receiver discriminator unit should be adjusted to yield a noise power ratio of 40 db.

9. Place 70KC stop band filter in the "out" position.

10. Set the noise receiver band selector switch to position 8 (2438KCS).

11. Set the noise receiver attenuator switches to 20 db.

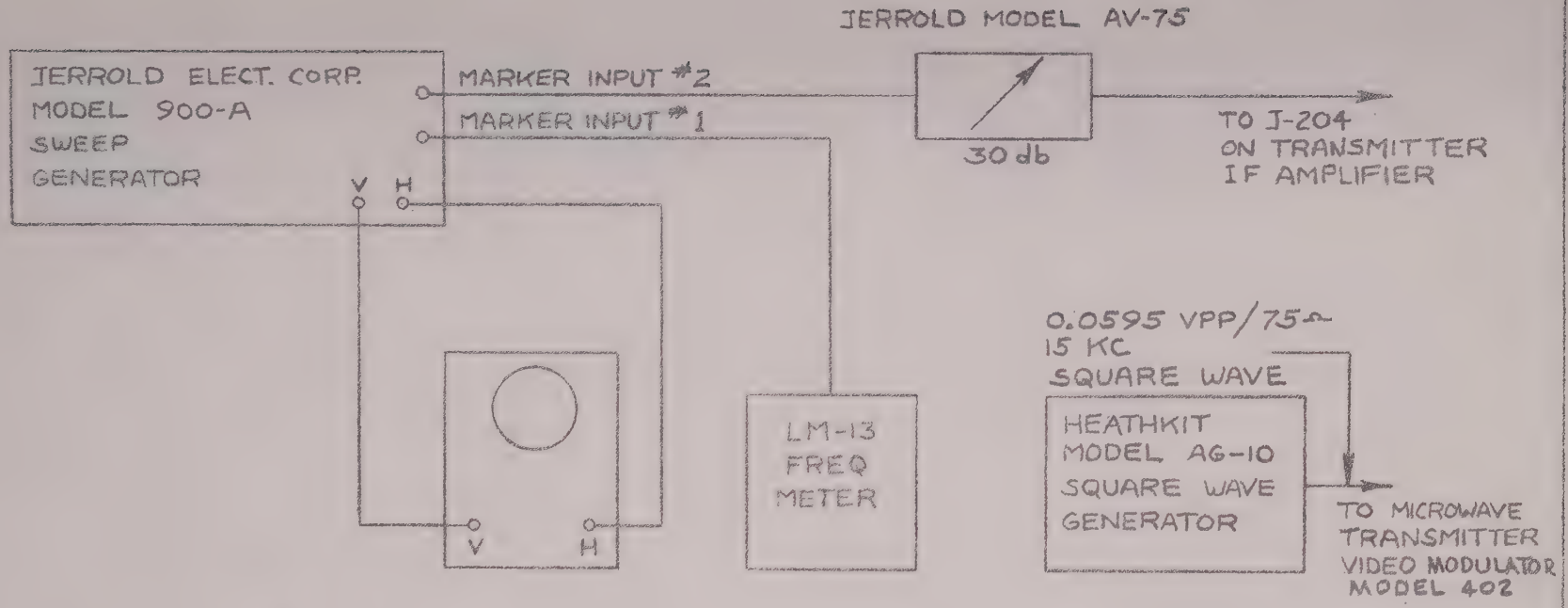
12. Adjust noise receiver sensitivity control to obtain a reference reading on the meter.

13. Place the 2438KC filter on the "IN" position.

14. Adjust the noise receiver attenuators to return to the reference set in step 12.

15. Adjust the microwave receiver phase equalizer to obtain a noise power ratio of 40 db.

16. Repeat steps 4 through 15 to obtain 40 db noise power ratio in both 70KC and 2438KC slots.



NOTE:

1. FOR VIDEO MODULATOR MODEL 401
   SET SQUARE WAVE GENERATOR
   FOR 1.07 VPP/75Ω.

SYSTEM TEST PROCEDURE
WHITE NOISE BASEBAND LOADING
MICROWAVE TRANSMITTER
FREQUENCY DEVIATION CALIBRATION

FIGURE — 1

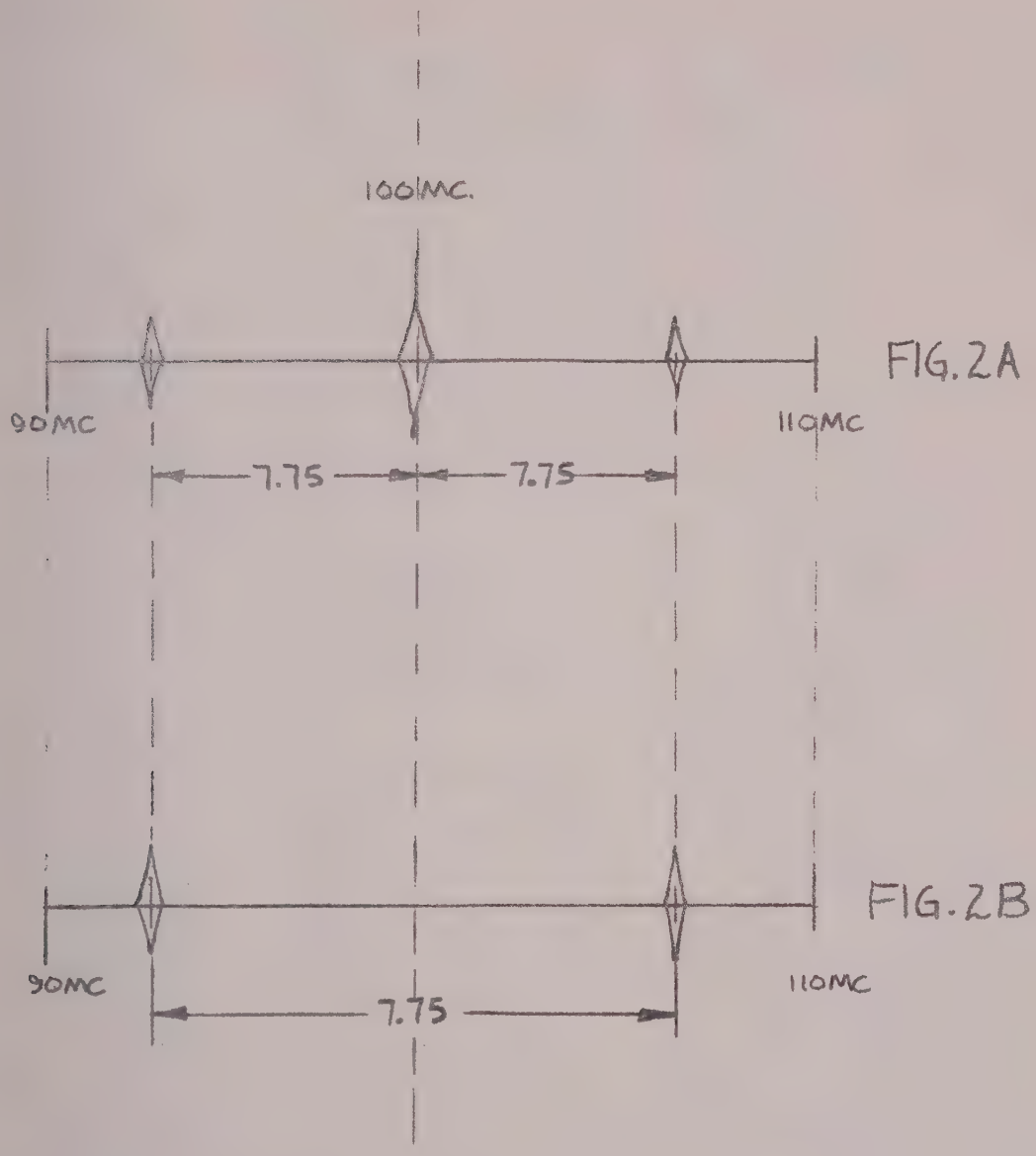
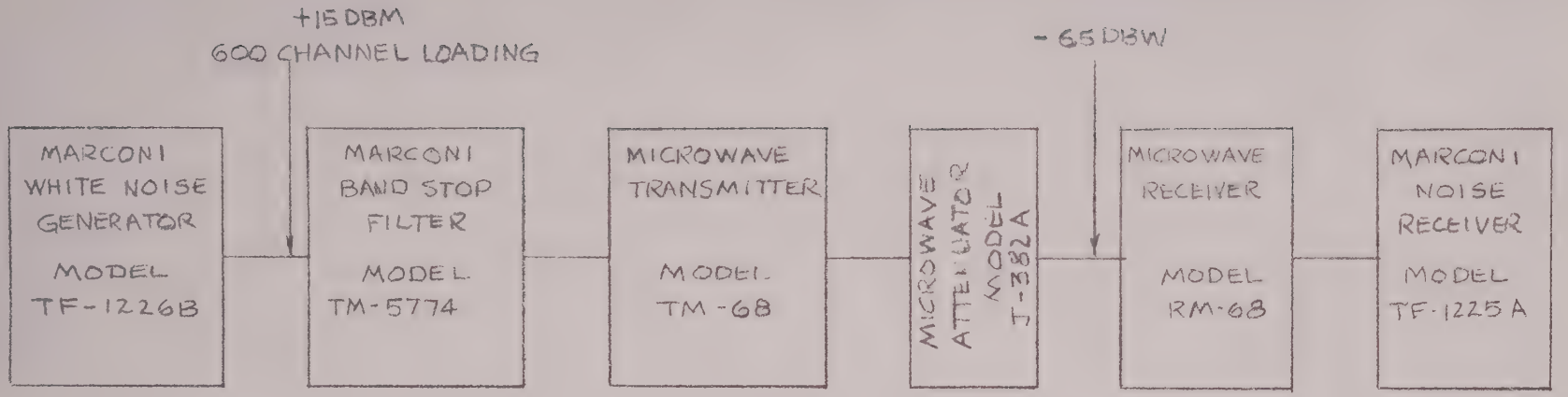


FIG. 2A

FIG. 2B

SYSTEM TEST PROCEDURE
MICROWAVE TRANSMITTER
FREQUENCY DEVIATION CALIBRATION



SYSTEM TEST PROCEDURE

WHITE NOISE BASEBAND LOADING

FIGURE-3

PARTS LIST

OR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

T DESCRIPTION: WAVEGUIDE, MODEL 701 RELEVANT DWG. C-239

WN J. A. N. CHECKED E.M.S. SH. 1 OF 1

DATE: 10-25-62

HEMATIC IGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
1,702				1000mmf	2
3				5-25mmf, trimmer	1
1,102	K & F			coils, tuned, K&F	2
01				1N23C or 1N23D mixer crystal	1
1				27 ohms, 1/2W, ±10%	1
4				UG58A/U type N connector	1
5	Jerrold	Type F-61		coax connector	1

PARTS LIST

AJOR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

NIT DESCRIPTION: PRE-AMP, MODEL 401 — RELEVANT DWG. C-194

RAWN J. A. N. — CHECKED E.M.S. — SH. 1 OF 2

DATE: 10-25-62

SCHEMATIC DESIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				CAPACITORS	
-01,418,419, 32,434				5-25mmf, trimmer, NPO	5
-02,414,415, 16,426,427				1000mmf, dog bone	6
-03,404,405, 06,407,408, 09,410,411, 12,413,417, 21,422,423, 24,425,428, 29,430,431, 38,439				1000mmf, feed-thru	23
20,433				27mmf, TCZ	2
37				15mmf, TCZ	1
				COILS	
01,402,403, 6 thru 419, 1	K & F			tuned coils, K&F Special	18
04,405	K & F			fixed coils, K&F Special	2
20,T401	K & F			bifilar coils, K&F Special	2
				CONNECTORS	
01,402,403, 4,405	Jerrold	Type F-61		chassis-fitting	5
406				multi-connector plug, P310AB	1
				RESISTORS	
-01				56 ohms, 1/2W, ±10%	1
-02,403				39K ohms, 1/2W, ±10%	2

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

IT DESCRIPTION: PRE-AMP, MODEL 401 — RELEVANT DWG. C-194

AWN J. A. N. — CHECKED E.M.S. — SH. 2 OF 2

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
04				220 ohms, 1/2W, ±10%	1
05,408				680 ohms, 1/2W, ±10%	2
06,409				10 ohms, 1/2W, ±10%	2
07,410,413, 4,423				270 ohms, 1/2W, ±10%	5
11				470K ohms, 1/2W, ±10%	1
12,415				47 ohms, 1/2W, ±10%	2
20,421				18 ohms, 1/2W, ±10%	2
22	Jerrold	TR-72F		Terminating Resistor	1
			TUBES		
01				6DJ8/6922, twin-triode	1
02,403				E180F/6688, pentode	2

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

IT DESCRIPTION: BAND PASS FILTER, MODEL NO.7520 RELEVANT DWG. B-185

AWN J. A. N. CHECKED E.M.S. SH. 1 OF 1

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				CAPACITORS	
01,805,807				4.7mmf, 600WVDC, TCZ	3
02,808				2.2mmf, TCZ	2
03,804,806				10mmf, TCZ	3
				CONNECTORS	
01,802	Jerrold	Type F-61		Chassis fitting	2
				COILS	
01,807				coils	2
02,808				coils	2
03,806				coils	2
04,805				coils	2

PARTS LIST

OR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

T DESCRIPTION: I. F. AMPLIFIER — RELEVANT DWG. C-193

WN J. A. N. — CHECKED E.M.S. — SH. 1 OF 3

DATE: 10-25-62

HEMATIC IGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				CAPACITORS	
1,243,245				5-25mmf, trimmer, NPO	3
2,208,215, ,224,232, ,260,261				330mmf, dog bone	9
3 thru 207 9 thru C214 7 thru 223 5 thru 231 4 thru 242 6 thru 257 6 thru 270				1000mmf, feed-thru	51
4				22mmf, TCZ	1
9,263				0.22mf, 400WVDC	2
2				3.3mmf, TCZ	1
4				15mmf, TCZ	1
5				1.0mf, 200V	1
1,272				80mf, 16WVDC, electrolytic	2
3				2mf, 200WVDC, metallized paper	1
				COILS	
1 thru 223	K & F			tuned coils, K&F Special	23
1	K & F			Bifilar coil, K&F Special	1
				CONNECTORS	
1,202,203	Jerrold	Type F-61		Chassis fittings	3

PARTS LIST

R EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

DESCRIPTION: I. F. AMPLIFIER RELEVANT DWG. C-193

N J. A. N. CHECKED E.M.S. SH. 2 OF 3

DATE: 10-25-62

EMATIC GNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
4				Multi-connector plug, P315-EB	1
				RECTIFIERS	
01	Solitron	CER-70		Silicon diode, 400V (PIV), 750ma	1
02,203				1N914, silicon diode, 75V(PIV) 10ma	2
				RESISTORS	
,211,221				270 ohms, 1/2W, ±10%	3
,207,212, 222				27 ohms, 1/2W, ±10%	5
,208,213, 223				33 ohms, 1/2W, ±10%	5
,209,214, 224				680 ohms, 1/2W, ±10%	5
,210,215, 225,233,				10 ohms, 1/2W, ±10%	7
,216				180 ohms, 1/2W, ±10%	2
				1.2M, 1/2W, ±10%	1
)				220K ohms, 1/2W, ±10%	1
				1.5K ohms, 1/2W, ±10%	1
				15K ohms, 1W, ±10%	1
				47K ohms, 1W, ±10%	1
,238,239				150K ohms, 1/2W, ±10%	3
				270K ohms, 1/2W, ±10%	1
				390K ohms, 1/2W, ±10%	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

IT DESCRIPTION: I. F. AMPLIFIER — RELEVANT DWG. C-193

AWN J. A. N. — CHECKED E.M.S. — SH. 3 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
36				330K ohms, 1/2W, ±10%	1
40				6.8K ohms, 1/2W, ±10%	1
44				50K ohms, 2W, potentiometer	1
47	Jerrold			Jerrold Model TR-72F	1
		TUBES			
201,202,203, 204,205				E180F/6688, pentode	5
206				6U8A/6678 triode-pentode	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

IT DESCRIPTION: DISC. & AFC — RELEVANT DWG. C-195

AWN J. A. N. — CHECKED E.M.S. — SH. 1 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
01				5-25mmf, trimmer, NPO	1
02,103				1.5-7mmf, trimmer, NPO	2
04,138				22mmf	2
05,108 ru 119, 21 thru 3, C130 ru 133, 35 thru 7, C140 i 141				1000mmf, feed-thru	30
06,146				10mmf, TCZ	2
07,120				330mmf	2
29,148				1000mmf	2
34A,B				500mf, 5WVDC; 50mf, 150WVDC, dual electrolytic	1
42				0.5mf, 200V	1
43,147,150,				0.22mf, 400WVDC	4
44,145				0.01mf, ceramic disc	2
49				50mf, 25WVDC, electrolytic	1
			COILS		
1 thru 109	K & F			tuned coils, K&F Special	9
24,125	K & F			coils, K&F Special	2
			CONNECTORS		
1,102	Jerrold	Type F-61		chassis fitting	2

PARTS LIST

OR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

T DESCRIPTION: DISC. & AFC RELEVANT DWG. C-195

WN J. A. N. CHECKED E.M.S. SH. 2 OF 3

DATE: 10-25-62

HEMATIC IGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
03				15-terminal plug, P315EB	1
				RECTIFIERS	
101,102, ,104				1N914, silicon diode	4
105,106	Solitron	CER-70		silicon diode, 400V (PIV), 750ma	2
				RESISTORS	
1				270 ohms, 1/2W, ±10%	1
2				27K ohms, 1/2W, ±10%	1
3				100 ohms, 1/2W, ±10%	1
4,120				10 ohms, 1/2W, ±10%	2
5,111				1K ohm, 1/2W, ±10%	2
6				220 ohms, 1/2W, ±10%	1
7				100K ohms, 1/2W, ±10%	1
8				560 ohms, 1/2W, ±10%	1
9				390 ohms, 1/2W, ±10%	1
0,112				120 ohms, 1/2W, ±10%	2
3,114				1.2K ohms, 1/2W, ±10%	2
5				120K ohms, 1/2W, ±10%	1
6, 117,				47K ohms, 1/2W, ±10%	3
8				680 ohms, 1W, ±10%	1
9				100 ohms, 2W, potentiometer	1
1				240K ohms, 1/2W, ±5%	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

IT DESCRIPTION: DISC. & AFC RELEVANT DWG. C-195

AWN J. A. N. CHECKED E.M.S. SH. 3 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
22,123				270K ohms, 1/2W, ±10%	2
24,128,129				470K ohms, 1/2W, ±10%	3
26,127				2.7 Megohms, 1/2W, ±10%	2
30				120K ohms, 1/2W, ±10%	1
31				4.7K ohms, 1W, ±10%	1
32				15K ohms, 1W, ±10%	1
33				30K ohms, 5W, WW	1
34,138				8K ohms, 3W, WW	2
35				500 ohms, WW potentiometer	1
36,137				1.2K ohms, 3W, WW	2
39				45K ohms, 10W, WW	1
40,141				820K ohms, 1/2W, ±10%	2
42				15K ohms, 2W, ±10%	1
43				150 ohms, 1/2W, ±10%	1
44				2.7K ohms, 1/2W, ±10%	1
45				3.9K ohms, 1/2W, ±10%	1
46,147				10 Megohms, 1/2W, ±10%	2
48				330K ½W ±10%	1
			TUBES		
01				E180F/6688, pentode	1
02				12BY7A/7733, pentode	1
03				6CL6/6677, pentode	1
04,105				12AX7/6681, twin-triode	2
06				12AU7/6680, twin-triode	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

IT DESCRIPTION: VIDEO AMPLIFIER — RELEVANT DWG. C-196

AWN J. A. N. — CHECKED E.M.S. — SH. 1 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				CAPACITORS	
)1				5-25mmf, trimmer, NPO	1
)2,306,310,				0.01mf, ceramic disc	4
)3A,B, 5A,B				150 + 150mf, 250WVDC, electrolytic	2
)4,305,307, ,312,313				0.22mf, 400WVDC	6
)9				6.8mmf, TCZ	1
1				330mmf	1
6				150mf, 150V, electrolytic	1
7				3000mf, 15V, electrolytic	1
8				200mmf	1
				COILS	
1,302	K & F			tuned coils, K&F Special	2
3				25 microhenry, choke coil	1
4				75 microhenry, choke coil	1
				CONNECTORS	
1,302,303	Jerrold	Type F-61		Chassis fitting	3
)4				Multi-connector plug, P312AB	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

IT DESCRIPTION: VIDEO AMPLIFIER — RELEVANT DWG. C-196

AWN J. A. N. CHECKED E.M.S. — SH. 2 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				RESISTORS	
01,315,316, 2,324				270K ohms, 1/2W, ±10%	5
09				470K ohms, 1/2W, ±10%	1
10				68K ohms, 1/2W, ±10%	1
02, 312,317,				240K ohms, 1/2W, ±5%	4
03				560 ohms, 1/2W, ±10%	1
04				4.7K ohms, 1/2W, ±10%	1
05				2.7K ohms, 1/2W, ±10%	1
06,307				1.5K ohms, 1W, ±10%	2
08,314,321				10 ohms, 1/2W, ±10%	3
11				1K ohm, 1W, ±10%	1
13,320				330 ohms, 1/2W, ±10%	2
18				1.5K ohm, 1/2W, ±5%	1
19				4.3K ohms, 1W, ±5%	1
23				180K ohms, 1/2W, ±10%	1
25				10K ohms, 1/2W, ±10%	1
26				100 ohms, 1/2W, ±10%	1
28				330 ohms, 1W, ±10%	1
29				100 ohms, 2W, ±10%	1
30				330 ohms, 2W, ±10%	1
31				300 ohms, 1/2W, ±5%	1
32				56 ohms, 1/2W, ±10%	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

IT DESCRIPTION: VIDEO AMPLIFIER — RELEVANT DWG. C-196

AWN J. A. N. — CHECKED E.M.S. — SH. 3 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				SWITCH	
301				DPDT, slide switch	1
				TUBES	
01				6CY5/7717, pentode	1
02				6DJ8/6922, twin-triode	1
03				6CL6/6677, pentode	1

PARTS LIST

OR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

T DESCRIPTION: COMMON CONNECTION PANEL, 501A — RELEVANT DWG. C-203

WN J. A. N. — CHECKED E.M.S. — SH. 1 OF 3

DATE: 10-25-62

HEMATIC IGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				CAPACITORS	
1 2				0.1 mf, 1600VDC .01 MFD 1000 WVDC	1 1
				CONNECTORS	
1, 502				"N" type coaxial cable fittings, male	2
3				Modified type UG58/U fitting	1
01				6-terminal socket, type 3306AB	1
02				12-terminal socket, type S312AB	1
03				15-terminal plug, type P315DB	1
04				12-terminal socket, type S312CCT	1
05,506				15-terminal socket, type S315CCT	2
07				10-terminal socket, type S310CCT	1
				RECTIFIERS	
501				1N588 silicon diode	1
502	Solitron	CER-70		Silicon diode, 400V (PIV), 750ma	1
				RELAY	
	Price Electric	5424-59		4P2T, 10K	1
				RESISTORS	
				50K ohms, 2W, potentiometer	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

IT DESCRIPTION: COMMON CONNECTION PANEL, 501A RELEVANT DWG. C-203

AWN J. A. N. CHECKED E.M.S. SH. 2 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
02				1K ohm, 2W, potentiometer	1
03				500K ohms, 2W, potentiometer	1
04				1M, 2W, potentiometer, dual mount	1
05				250K ohms, 2W, potentiometer, dual mount	1
06				1.8M, 1/2W, ±10%	1
07				47K ohms, 1/2W, ±10%	1
8,522				330K ohms, 1/2W, ±10%	2
9,510				10M, 1/2W, ±10%	2
11				3.9M, 1/2W, ±10%	1
2,517,521				100K ohms, 1/2W, ±10%	3
13				560 ohms, 1/2W, ±10%	1
14				68K ohms, 1/2W, ±10%	1
5,516				240K ohms, 1/2W, ±5%	2
18				10K ohms, 1/2W, ±10%	1
19				1.2M, 1/2W, ±10%	1
20				27K ohms, 1/2W, ±10%	1
3,528				56K ohms, 1/2W, ±10%	2
24				5.6M, 1/2W, ±5%	1
25				470K ohms, 1/2W, ±10%	1
26				2.7M, 1/2W, ±10%	1
27				5 ohms, potentiometer, WW	1

PARTS LIST

OR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

T DESCRIPTION: COMMON CONNECTION PANEL, 501A — RELEVANT DWG. C-203

WN J. A. N. CHECKED E.M.S. — SH. 3 OF 3

DATE: 10-25-62

HEMATIC IGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				SWITCHES	
01,502				SPST, toggle switch	2
03				Single-deck, 6 pos., double-terminal, rotary	1
04				5-deck, 6-pos., double-terminal, rotary	1
05				2-pos. push-pull, mounted on R504/R505	1
				TUBE	
-				Reflex klystron, type accd. to channel freq.	1

PARTS LIST

OR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

T DESCRIPTION: FRONT PANEL, MODEL 900 RELEVANT DWG. B-192

WN J. A. N. CHECKED E.M.S. SH. 1 OF 1

DATE: 10-25-62

EMATIC GNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
P1	Cinch-Jones	P-306-CCT		Plug	1
I01	Dialco	53-810MB-991-Red		Light Assembly	1
I02	Dialco	53-810MB-993-Amber		Light Assembly	1
	Triplett	Model 320M		Meter, DC 0-50 uA	1

PARTS LIST

OR EQUIPMENT: MICROWAVE RECEIVER — MODEL: RM-68

T DESCRIPTION: REAR PANEL, MODEL 701 — RELEVANT DWG. B-193

WN J. A. N. — CHECKED E.M.S. — SH. 1 OF 1

DATE: 10-25-62

HEMATIC IGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
03	Cinch-Jones	P-312-CCT-L		Plug	1
01	Cinch-Jones	7-140Y		Barrier Strip	1
1,702				Connector, SO-239	2

PARTS LIST

TOR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

T DESCRIPTION: RECEIVER POWER SUPPLY, MODEL 600 RELEVANT DWG. C-201

AWN J. A.N. CHECKED E.M.S. SH. 1 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
				CAPACITORS	
01,612				incorporated in SOLA transformers T601,602	2
02,603				80mf, 500V, electrolytic	2
04				60mf, 250WVDC	1
05				4mf, 2000V, electrolytic	1
07,608,609				3000mf, 15V, electrolytic	3
10A,B; 11A,B				150 + 150mf, 250V, dual-electrolytic	2
13				0.1mf, 1600WVDC	1
14				0.047mf, 400V	1
15				0.22mf, 400WVDC	1
16				0.1mf, 400V	1
17				0.01mf, 600WVDC, ceramic disc	1
				COILS	
01				8h, 85ma, 250 ohms, iron core choke	1
02				1.5h, 300ma, 40 ohms, iron core choke	1
03				8h, 300ma, 90 ohms, iron core choke	1
				CONNECTORS	
601				multi-connector, socket, #S315CCE	1

PARTS LIST

JOR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

IT DESCRIPTION: RECEIVER POWER SUPPLY, MODEL 600 RELEVANT DWG. C-201

AWN J. A. N. CHECKED E.M.S. SH. 2 OF 3

DATE: 10-25-62

CHEMATIC SIGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
602				AC plug, chassis mounted, #S315DB	1
				FUSES	
601				1.5A	1
602				10A	1
603				0.5A	1
604				0.1A	1
				PILOT LIGHTS	
601,602				NE-51	2
				RECTIFIERS	
R601 thru 8	Solitron	CER-70		silicon diode, 400V (PIV), 750ma	18
				RELAYS	
01	Amperite	115N060T		thermal delay relay switch	1
02	Guardian Elect.	IR-500-G115	5945-912-2584	beam power relay DPDT, 115VAC.	1
				RESISTORS	
01,612				100K ohms, 1/2W, ±10%	2
02				20K ohms, 10W, WW	1
03				2.2K ohms, 2W, ±10%	1
04				470K ohms, 1/2W, ±10%	1
05				820K ohms, 1/2W, ±10%	1
06				680K ohms, 1/2W, ±10%	1
07				330K ohms, 1/2W, ±10%	1

PARTS LIST

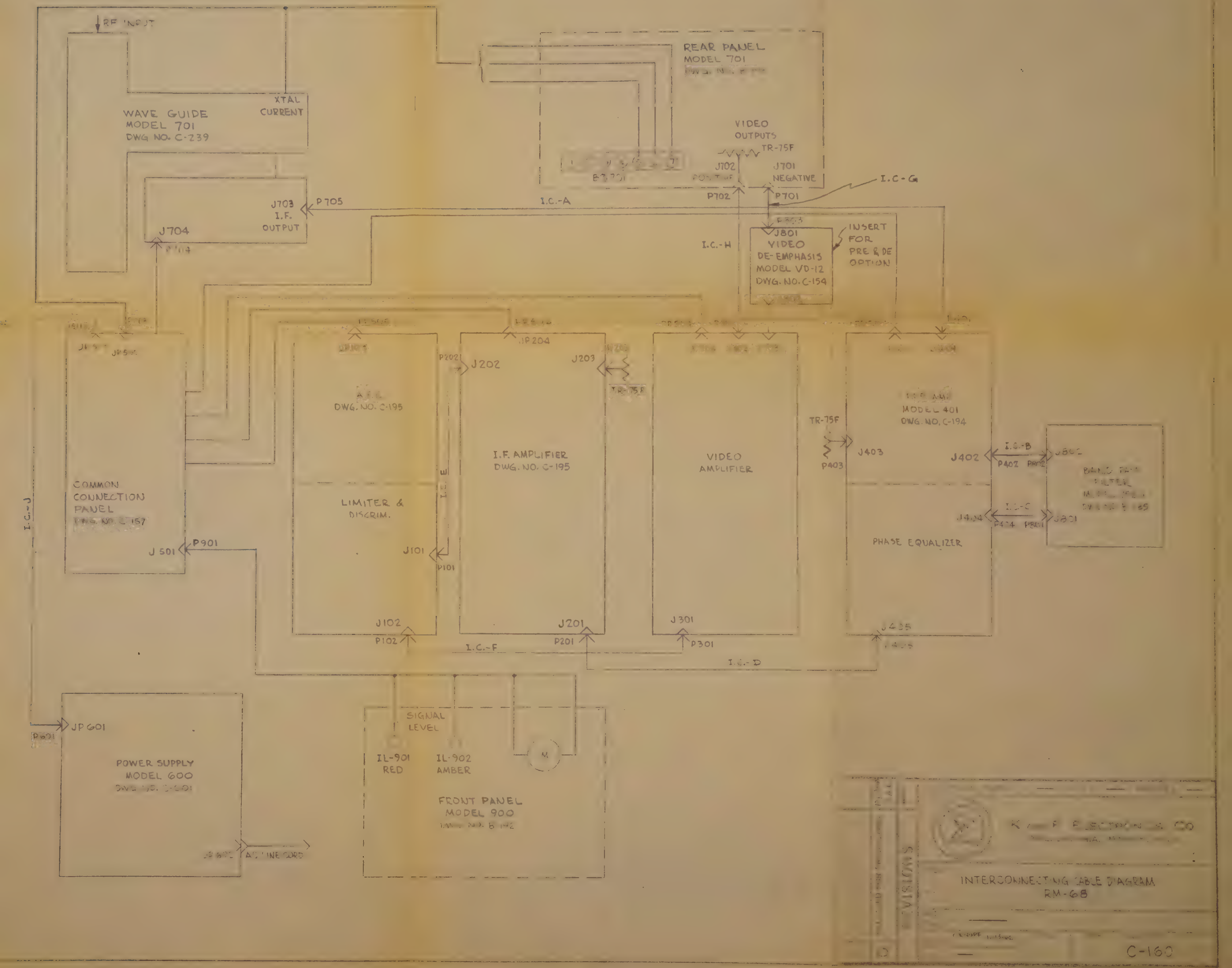
OR EQUIPMENT: MICROWAVE RECEIVER MODEL: RM-68

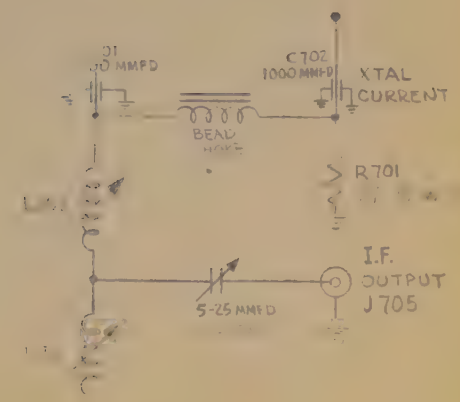
T DESCRIPTION: RECEIVER POWER SUPPLY, MODEL 600 RELEVANT DWG. C-201

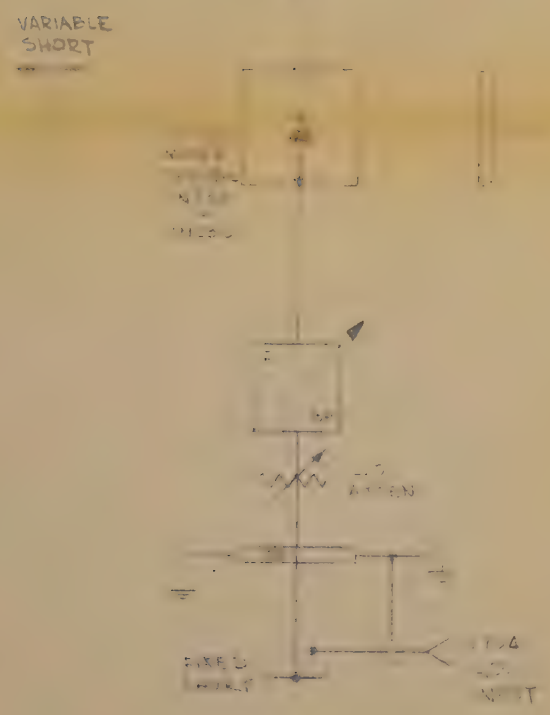
WN J. A. N. CHECKED E.M.S. SH. 3 OF 3

DATE: 10-25-62

HEMATIC IGNATION	MFR'S. NAME	MFR'S. NUMBER	K & F NUMBER	DESCRIPTION	QTY.
8				15 ohms, 25W, WW	1
9				3.5K ohms, 10W, WW	1
0				68K ohms, 1W, ±10%	1
1				91K ohms, 1W, ±5%	1
3				10K ohms, 2W, potentiometer	1
4				39K ohms, 1/2W, ±10%	1
5				47K ohms, 1W, ±10%	1
6				15K ohms, 1W, ±10%	1
8				1.5K ohm, 2W, ±10%	1
		SWITCHES			
01,602				SPST, toggle switch	2
		TRANSFORMERS			
1	Sola	71304		Transformer	1
2	Sola	7106		Transformer	1
		TUBES			
1				6146, pentode	1
2				6U8A/6678, triode-pentode	1
3				5651, voltage regulator	1
4				0B2, voltage regulator	1
5				0A2, voltage regulator	1
6				GV3B-600, voltage regulator	1


RF INPUT
WAVE GUIDE
MODEL 701
DWG NO. C-239
XTAL
CURRENT
REAR PANEL
MODEL 701
VIDEO
OUTPUTS
TR-75F
J702
J701
NEGATIVE
P702
P701
I.C.-G
J703
I.F.
OUTPUT
P705
I.C.-A
J704
P704
J801
VIDEO
DE-EMPHASIS
MODEL VD-12
DWG. NO. C-154
INSERT
FOR
PRE & DE
OPTION
I.C.-H
COMMON
CONNECTION
PANEL
J501
P901
I.C.-J
A.F.C.
DWG. NO. C-195
J202
P202
J203
TR-75F
I.F. AMPLIFIER
DWG. NO. C-195
LIMITER &
DISCRIM.
J101
P101
J102
P102
J201
P201
J301
P301
I.C.-F
I.C.-D
VIDEO
AMPLIFIER
TR-75F
P403
J403
MODEL 401
DWG. NO. C-194
J402
I.C.-B
P402
J404
I.C.-C
P404
P801
J801
PHASE EQUALIZER
J405
P405
JP601
P601
POWER SUPPLY
MODEL 600
DWG. NO. C-601
AC LINE CORD
SIGNAL
LEVEL
IL-901
RED
IL-902
AMBER
M
FRONT PANEL
MODEL 900
DWG. NO. B-192
REVISIONS
INTERCONNECTING CABLE DIAGRAM
RM-68
C-160

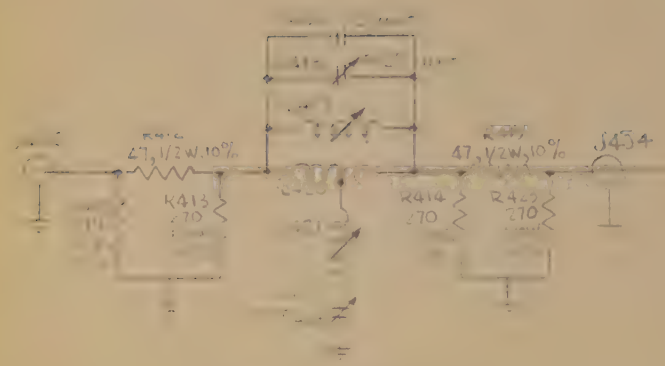

C702
1000 MMFD
XTAL
CURRENT
BEAD
R701
I.F.
OUTPUT
J705
5-25 MMFD


VARIABLE
SHORT

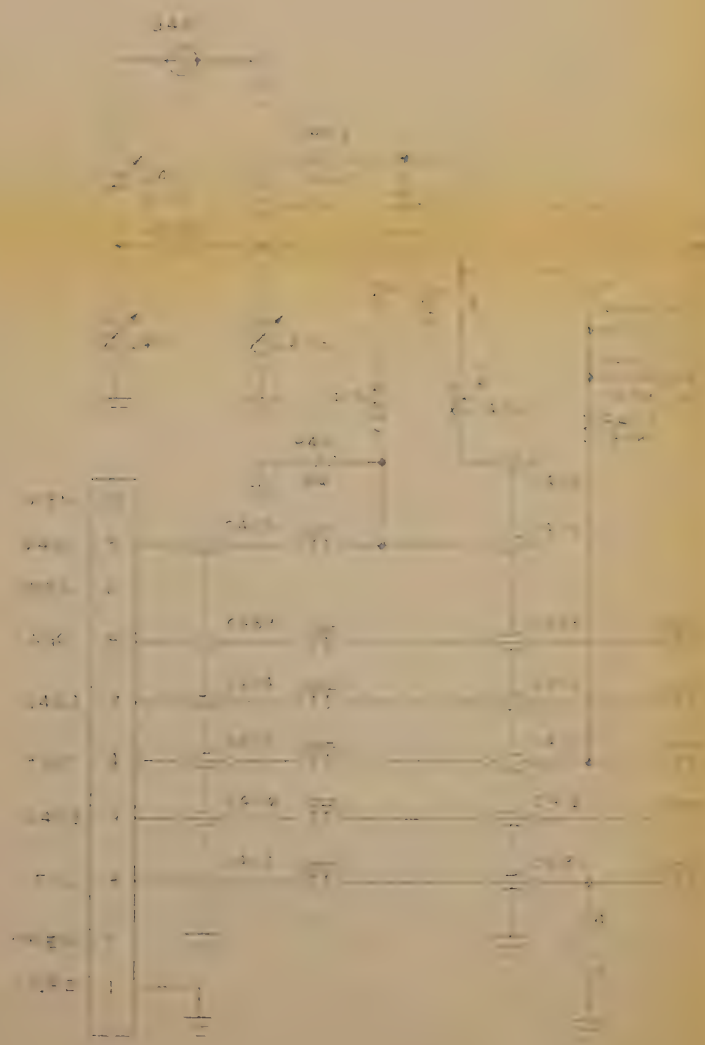
BP
AND PASS FILTER

VARIABLE
PHASOR
Δφ
SHORTING
PLATE

FILTER MODEL 7520
WHEN REQUIRED

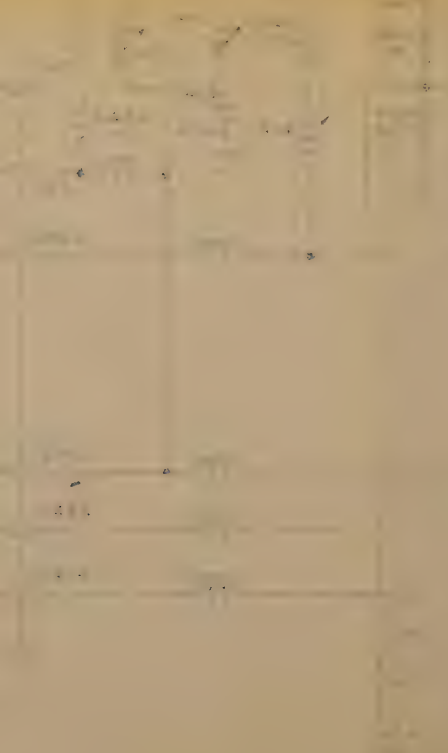


PHASE EQUALIZER



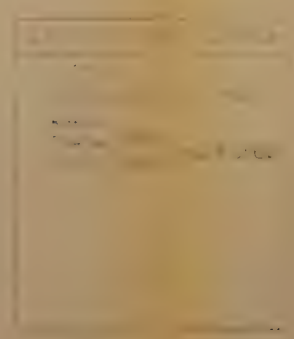
JP-406

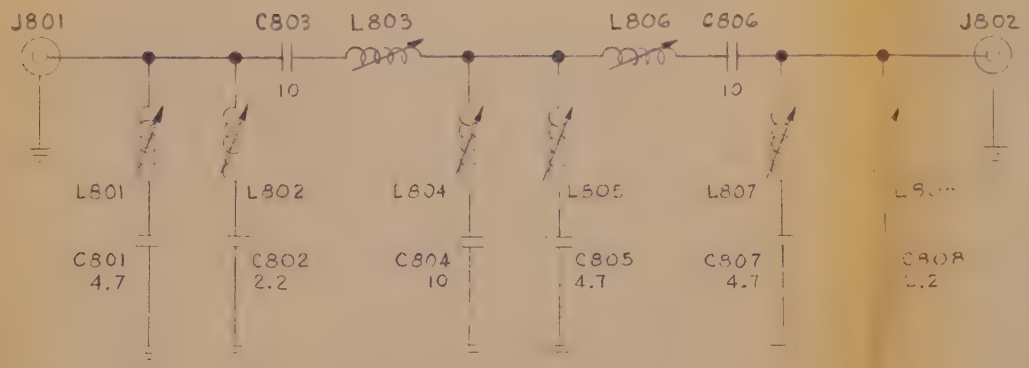
V401
6DJ8/6922



V402
E180F/6688

NOTE:
1. ALL RESISTORS - IN OHMS, 1/2W ±10%, UNLESS OTHERWISE NOTED.
2. ⊣⊢ INDICATES FEED THRU CAPACITOR 1000 μμf.
3. INDICATES FERRITE BEAD.
4. ALL CAPACITORS ARE IN μμf UNLESS OTHERWISE NOTED.





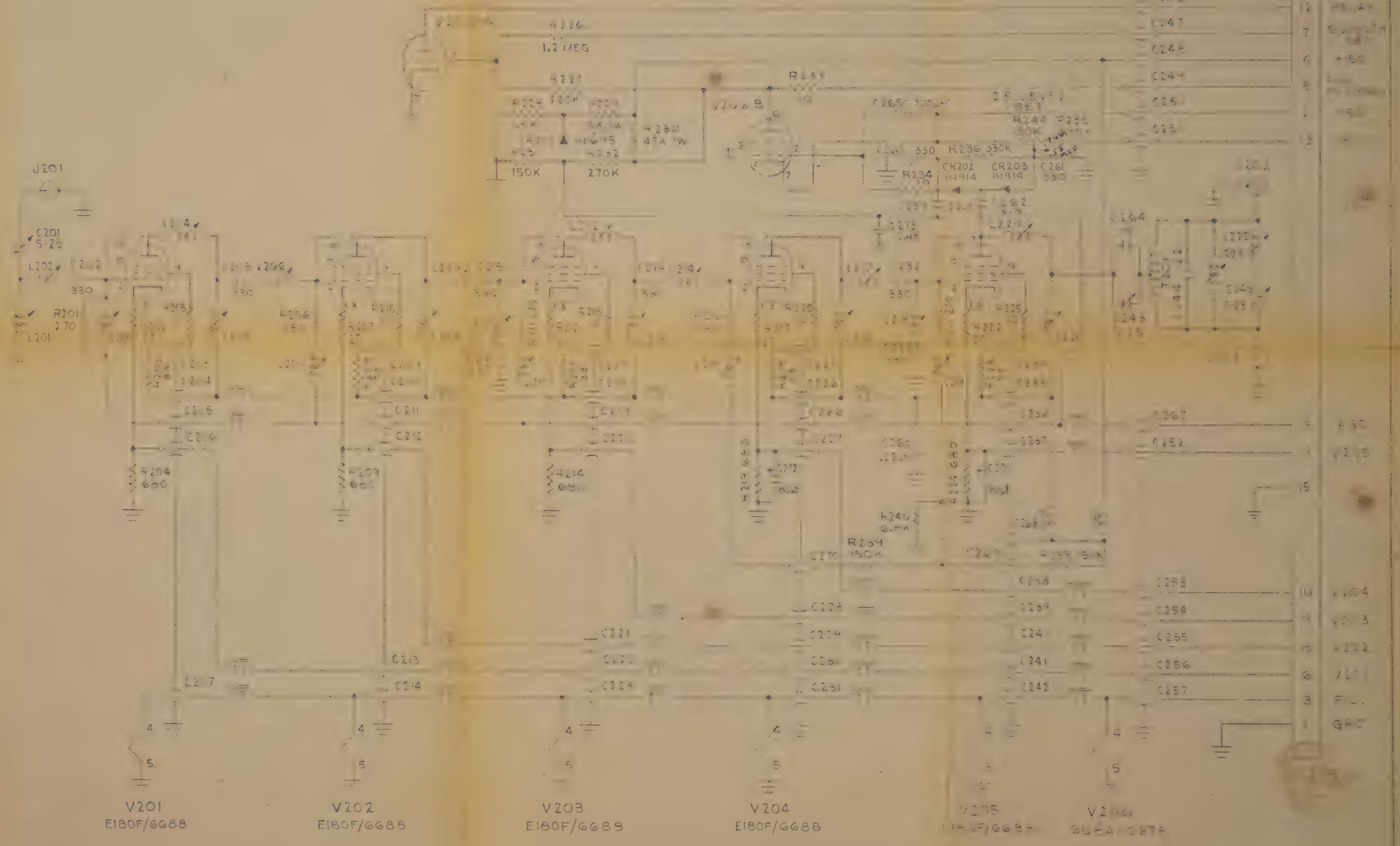
ALL CAPACITOR VALUES IN $\mu\mu f$

K AND F ELECTRONICS CO.

SCHEMATIC
BAND PASS FILTER
RM-68 MODEL Nº 7520

REVISIONS

B-185

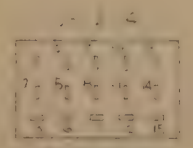


NOTE:

1. ALL RESISTORS – IN OHMS, 1/2W, ±10%, UNLESS OTHERWISE NOTED.
2. ⏚ INDICATES FEED THRU CAPACITOR 1000μμf.
3. ⏚ INDICATES FERRITE BEAD.
4. ALL CAPACITORS ARE IN μμf UNLESS OTHERWISE NOTED.

LAST S/150... ...OLL

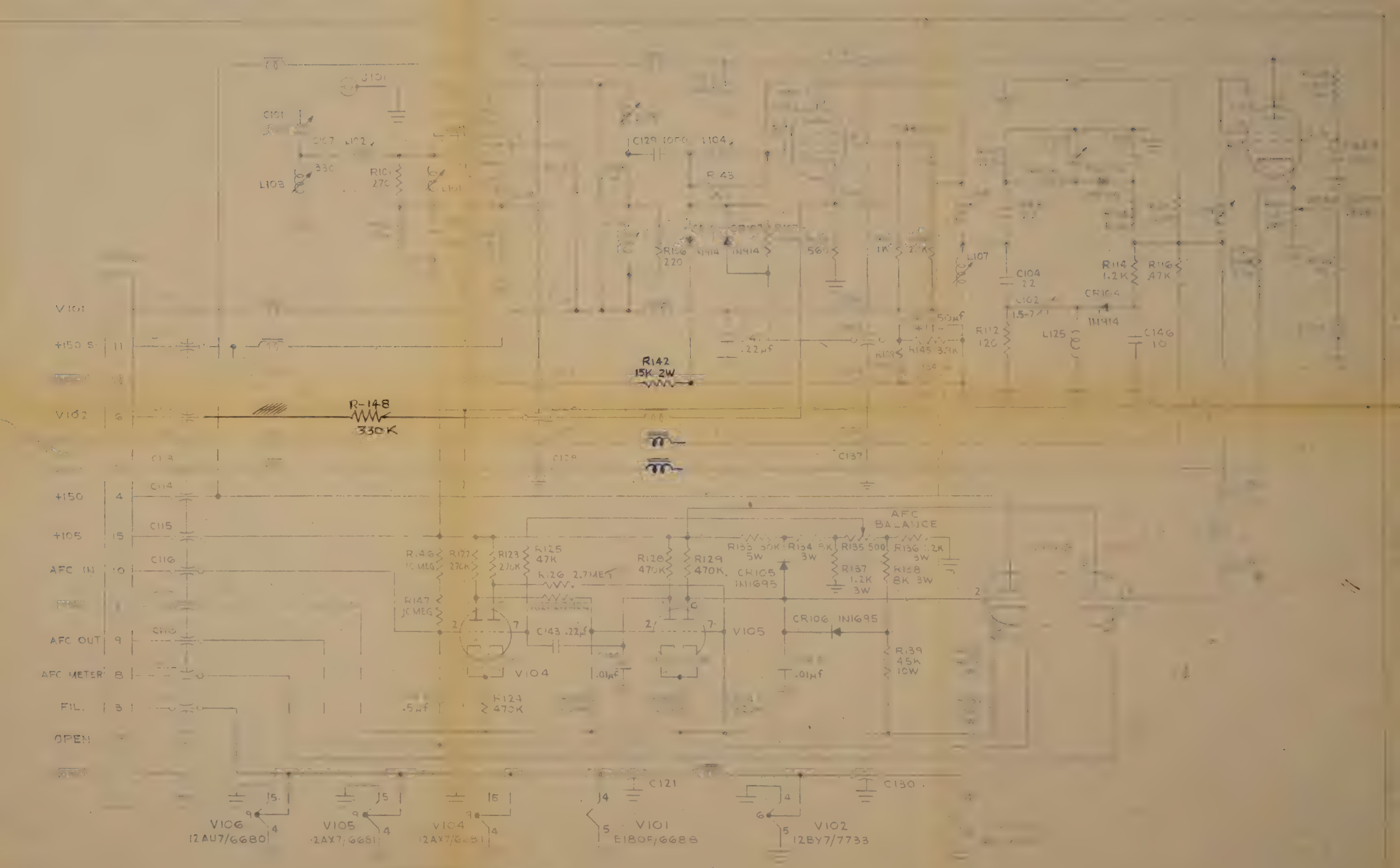
C273
C258 NOT USED
L223
R244
R241, R242
R243 NOT USED

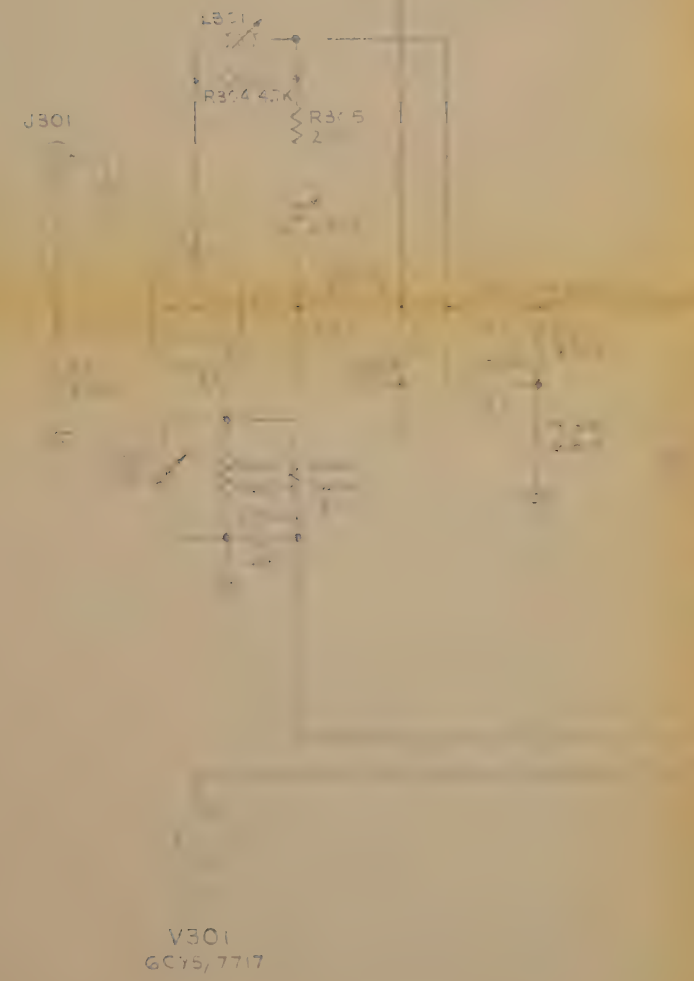


TOP VIEW

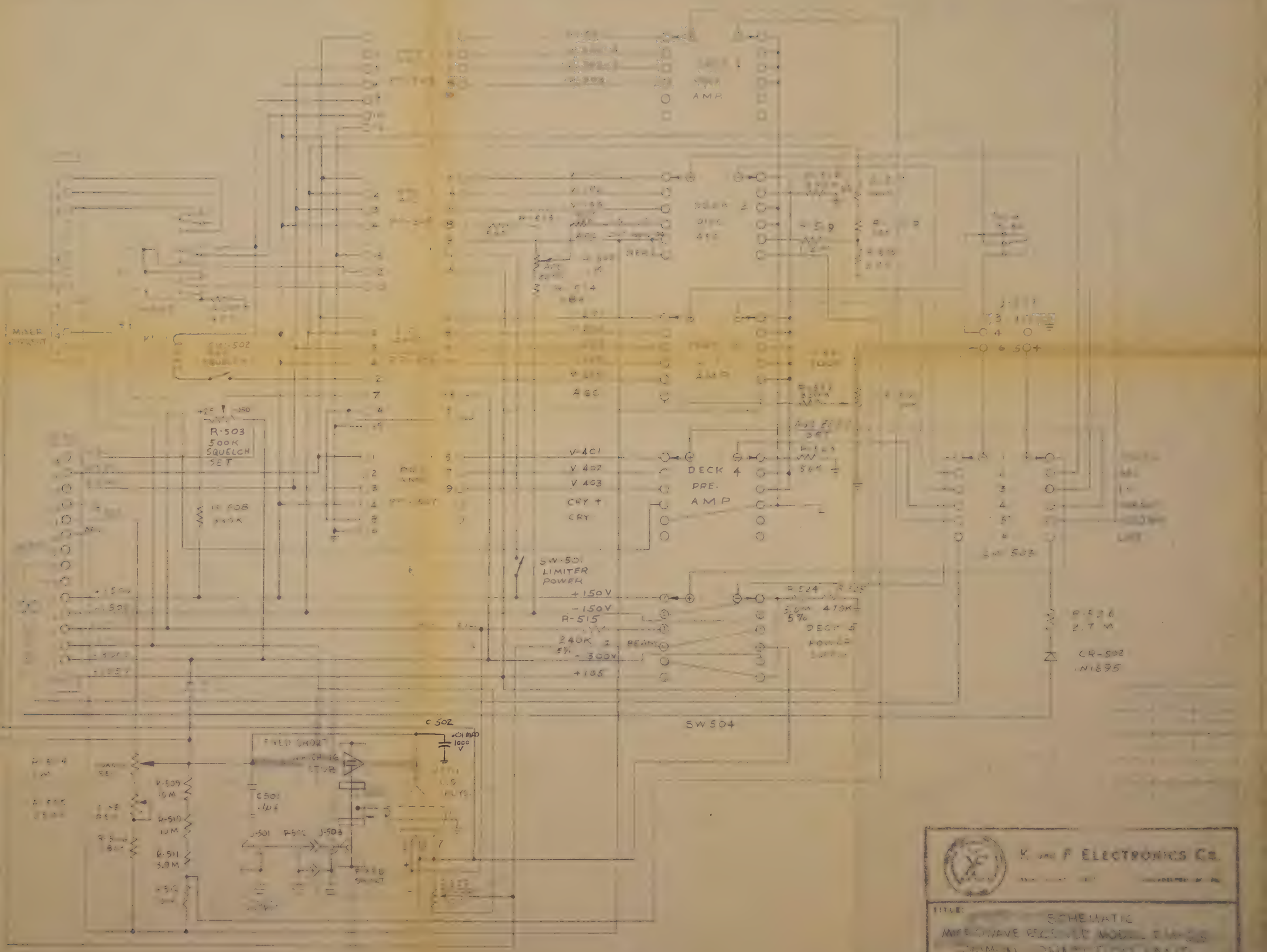
SCHEMATIC
RM-6F I.F. AMPLIFIER

C-193


J101
C101
C107
L102
L103
330
R101 270
L101
C129 .005
L104
R 45
R106 220
1N914
1N914
560
1K
2.2K
L107
C104 22
R114 1.2K
R116 47K
C102 1.5-7
CR104
1N914
50μf
+ | -
.22μf
R145 3.9K
R112 120
L125
C146 10
R142 15K 2W
R-148 330K
V101
+150 S
11
V102
6
C113
C114
+150
4
C115
+105
15
C116
AFC IN
10
C110
AFC OUT
9
AFC METER
8
FIL.
3
OPEN
R146 10 MEG
R127 270K
R123 270K
R125 47K
R126 2.7 MEG
R128 470K
R129 470K
AFC BALANCE
R133 50K 5W
R134 8K 3W
R135 500
R136 1.2K 3W
R137 1.2K
R138 8K 3W
CR105 1N1695
C143 .22μf
V104
.01μf
V105
CR106 1N1695
.01μf
R139 45K 10W
R124 470K
.5μf
C121
C130
V106 12AU7/6680
V105 12AX7/6681
V104 12AX7/6681
V101 E180F/6688
V102 12BY7/7733



NOTE:
1. ALL RESISTORS - IN OHMS, 1/2 W, ±10%, UNLESS OTHERWISE NOTED.
2. ALL CAPACITORS - IN μf UNLESS OTHERWISE NOTED.



K and F ELECTRONICS Co.

TITLE:

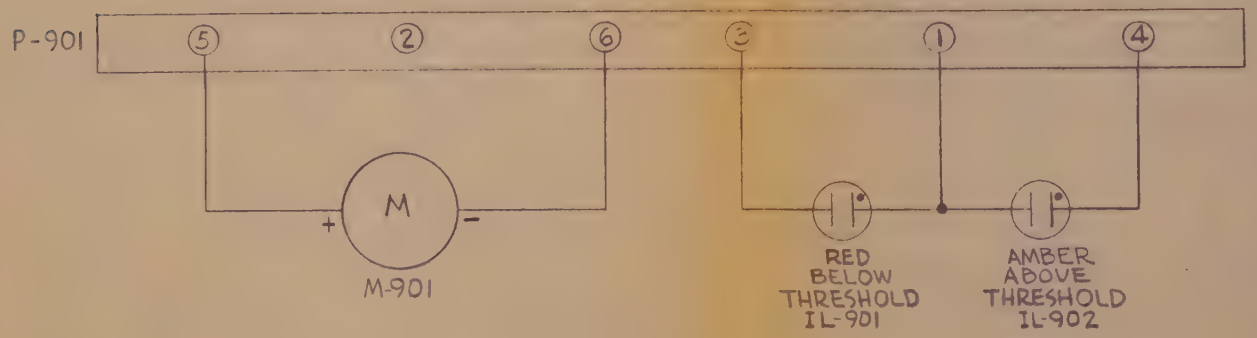
SCHEMATIC

MICROWAVE RECEIVER MODEL [illegible]

[illegible] CONVERSION [illegible]

MODEL [illegible]

C-[illegible]

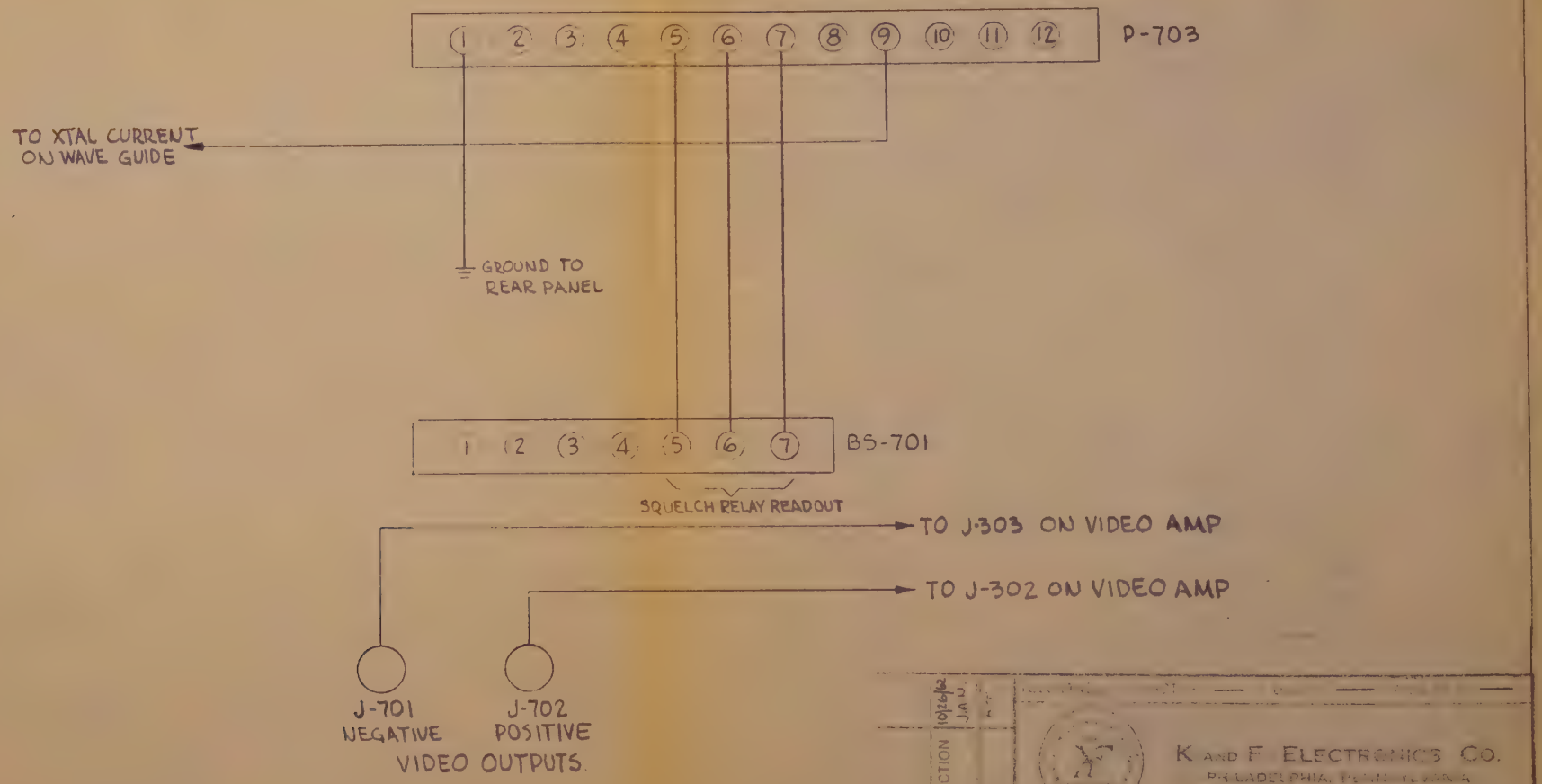


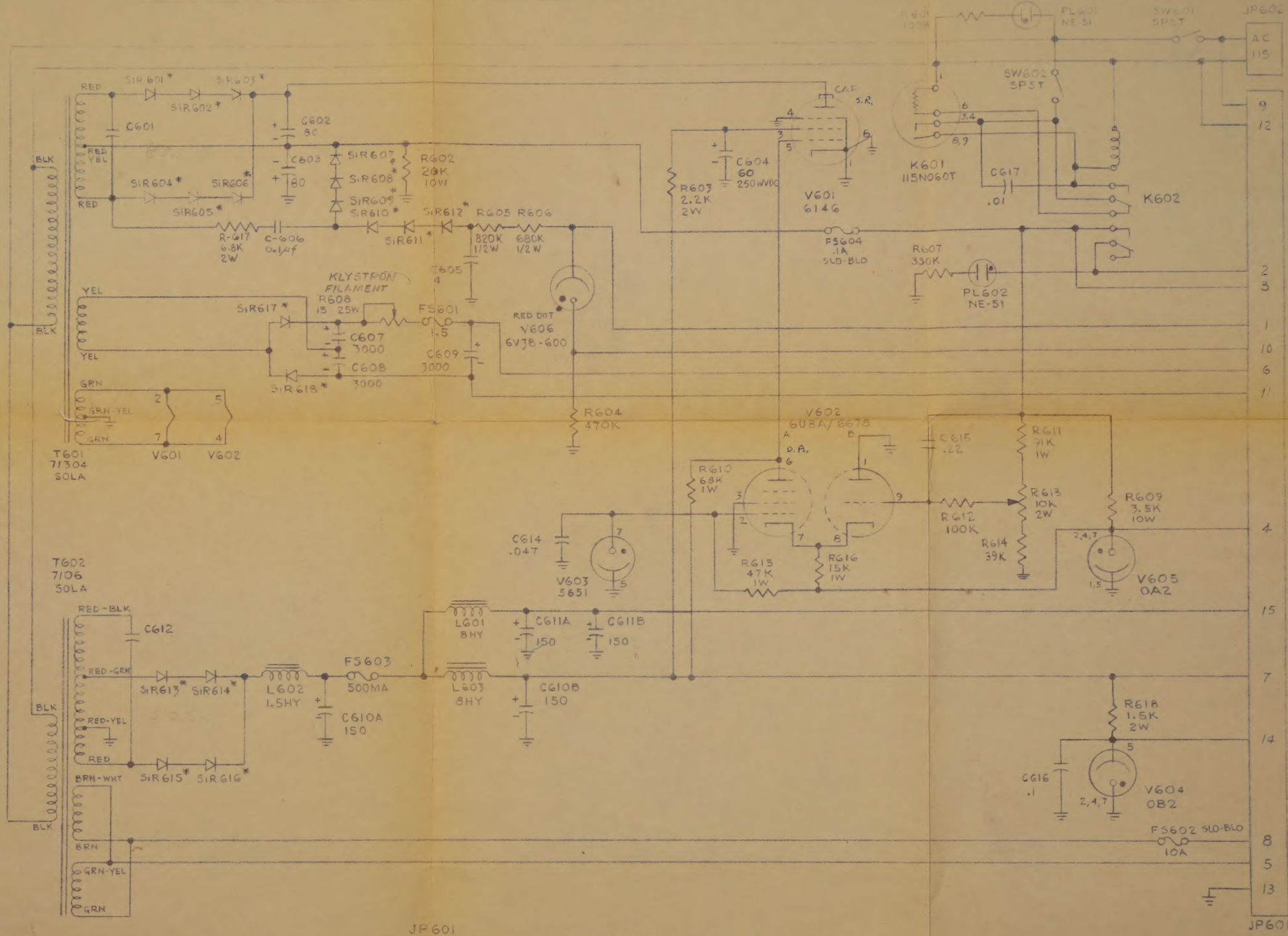
REVISIONS

SCHEMATIC
MICROWAVE RECEIVER
FRONT PANEL, MODEL 900

DRAWN: C. Knapp 10-26-62

PART NO.
B-192

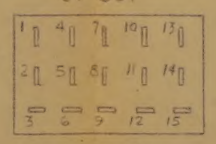

1 2 3 4 5 6 7 8 9 10 11 12
P-703
TO XTAL CURRENT ON WAVE GUIDE
GROUND TO REAR PANEL
1 2 3 4 5 6 7
BS-701
SQUELCH RELAY READOUT
TO J-303 ON VIDEO AMP
TO J-302 ON VIDEO AMP
J-701 NEGATIVE
J-702 POSITIVE
VIDEO OUTPUTS
REVISIONS
RELEASED FOR PRODUCTION
K AND F ELECTRONICS CO.
SCHEMATIC
MICROWAVE RECEIVER
REAR PANEL MODEL 701
CKD OFF 10-26-62
PART NO.
B-193



NOTES:-

1. * ALL SILICON RECTIFIERS (SIR) ARE TYPE SER-70
2. ALL CAPACITORS ARE IN μf, UNLESS OTHERWISE NOTED.
3. ALL RESISTORS ARE IN OHMS, ½W, ±10% UNLESS OTHERWISE NOTED.

JP601



TOP VIEW

LAST SYMBOL	NOT USED
C617	
R618	
SIR618	

REVISIONS			
O		10/23/62	W.H.L.
A	ECO 125 2-15-62 RELOCATED FS-604	2/24/62	W.H.L.
B	ECO-123 2-21-62 SIR SYMBOLS WERE CR		

K AND F ELECTRONICS CO.
PHILADELPHIA, PENNSYLVANIA

SCHEMATIC

RM-68 RECEIVER POWER SUPPLY MODEL 600

E.J.K. 10-21-62

C-201

BLOWER MAINTENANCE

The blower used to cool the klystron in this equipment has been designed to provide long term continuous operation. The blower motor contains sealed bearings and does not require lubrication. It is suggested that the blower assembly be inspected semi-annually for dust accumulation and cleaned, if required. When replacing klystrons, it is suggested that a cover be placed over the blower outlet to prevent klystron mounting hardware from dropping into the blower.

91619